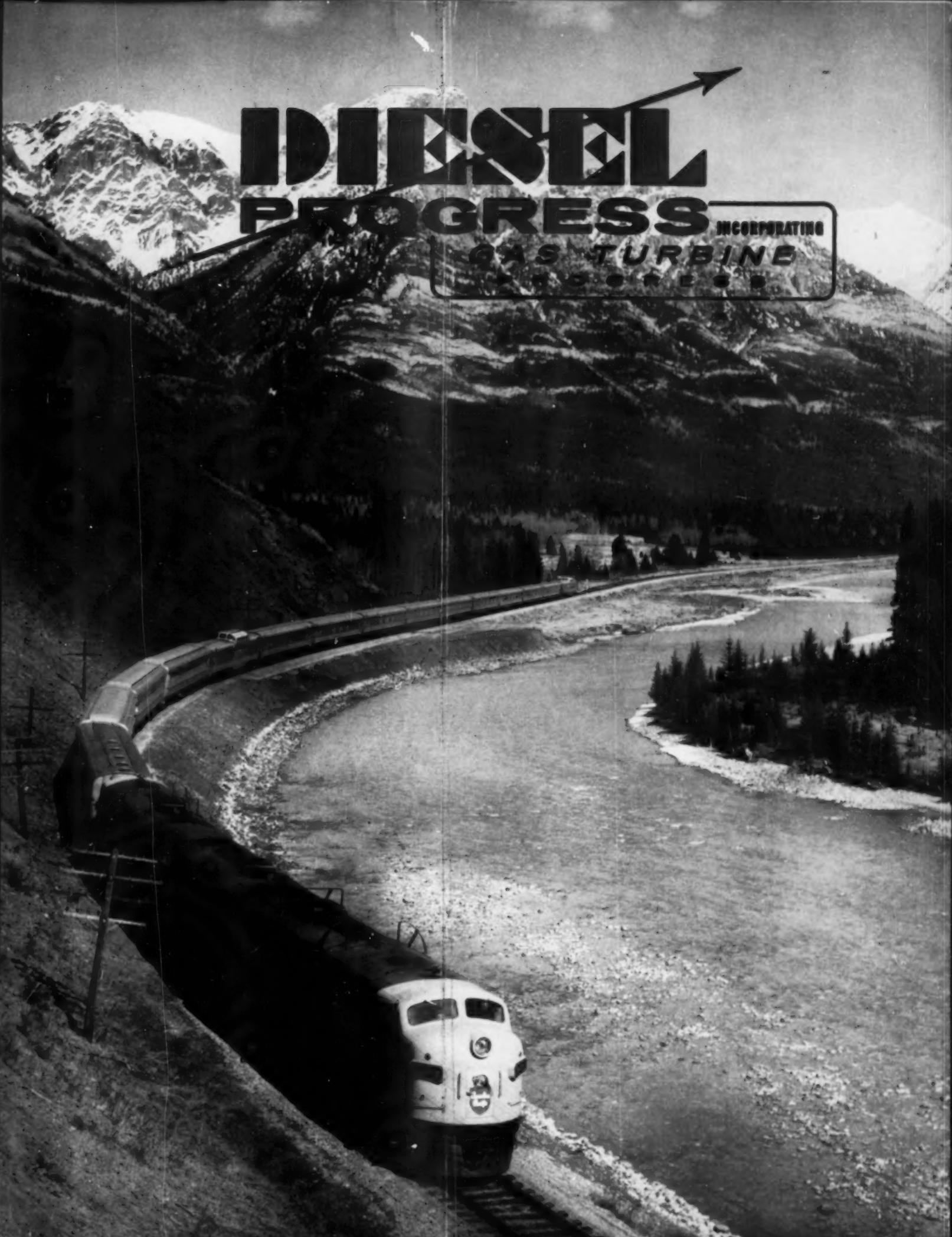


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



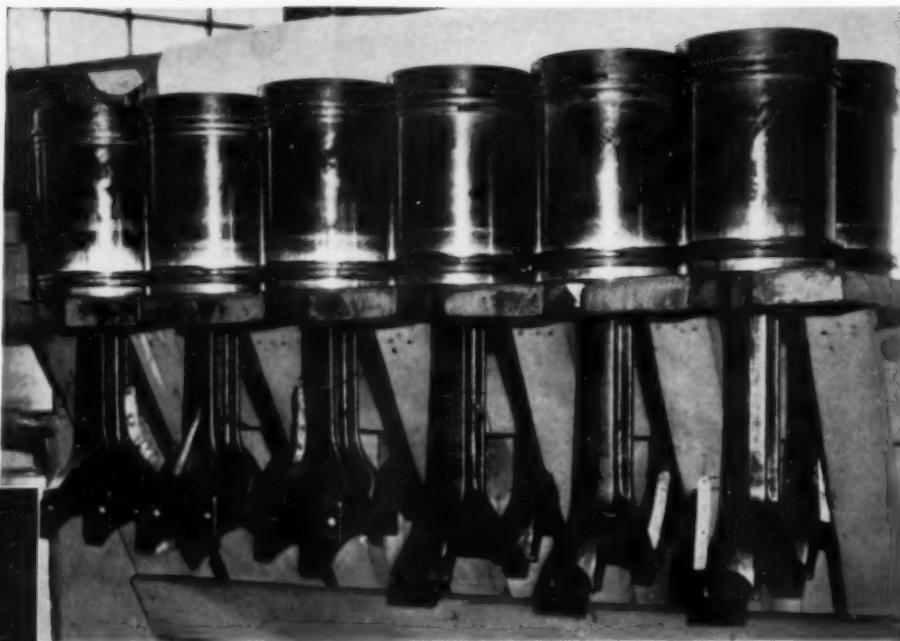
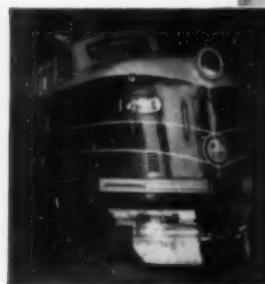
DIESEL
PROGRESS INCORPORATING
GAS TURBINE
POWER

FIVE DOLLARS PER YEAR

MAY, 1959

FIFTY CENTS PER COPY

The service history of these pistons, removed from a diesel locomotive engine, shows how Texaco Dieseltex assures long-lasting operation. In little less than 5 years, these pistons had provided more than one million miles of operation without parts replacement.



Whether your diesels run on rails, in buses or trucks or are stationary, Texaco lubricants assure dependable operation. Example:

These pistons are free from wear and scoring— even after 1,031,963 trouble-free miles

You can see how the complete set of railroad diesel pistons shown above has been kept clean and protected from wear. This is true even though it's been through a million miles—and almost five years of service—without any parts replacement. The lubricant used to keep the pistons clean was Texaco Dieseltex.

There are Texaco lubricants to protect power in *all* diesels—both moving and stationary—these two ways: 1) Detergent-dispersive action keeps pistons and all other

engine parts clean, 2) High film strength prevents wear and scoring by keeping an unbroken film between moving parts. This film is maintained even under severe conditions, throughout a wide range of operating temperatures.

For more information, just call the nearest of the more than 2,000 Texaco Distributing Plants or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



**MINIMUM DEPOSITS
—NO SCORING after
more than a million
miles of service lubri-
cated exclusively with
Texaco Dieseltex HD.**

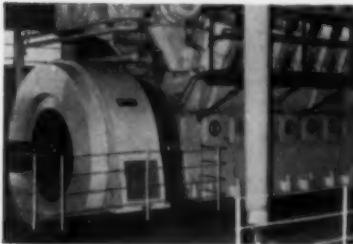


LUBRICATION IS A MAJOR FACTOR IN COST CONTROL
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

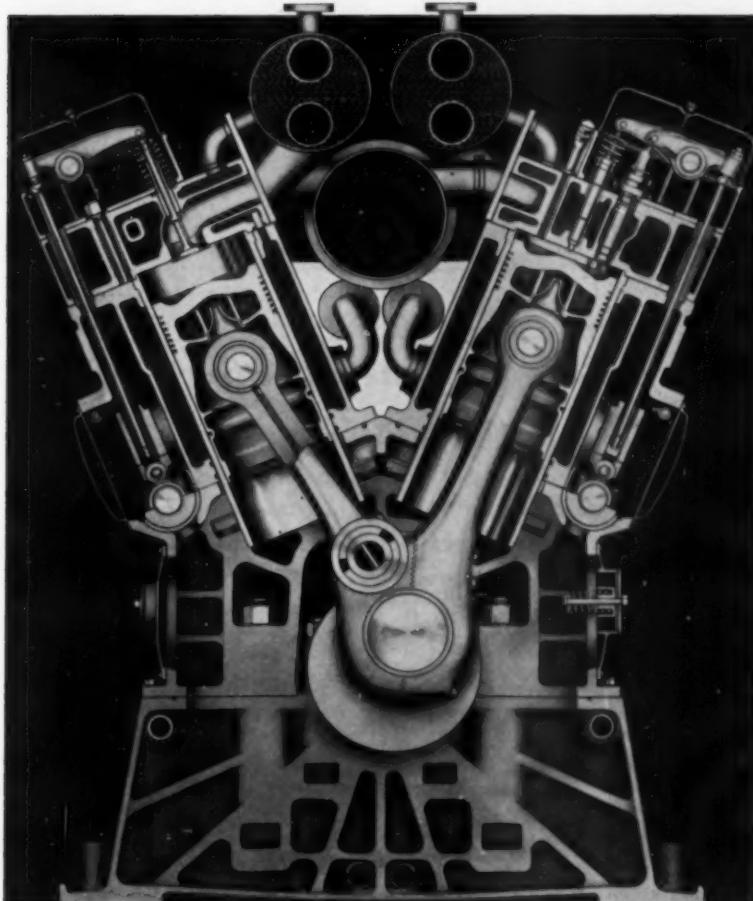


Hundreds of local, state and national visitors were on hand last July in Waverly, Iowa, when the city opened the doors of its \$651,334 power development project. Featured was the first United States installation of the RV-16, which here makes use of Bendix Fuel Injection in driving a 3,500 kw generator.

The RV-16 with Bendix Fuel Injection weighs 110 tons and stands 8 1/4 ft. high, 22 3/4 ft. long and 9 1/4 ft. wide. In spite of its large size it is the smallest diesel in the world rated at 7,700 hp. It is the fifth in the series of engines now being built by Enterprise to serve a wide variety of power needs, both stationary and marine.



BENDIX FUEL INJECTION FEEDS ENTERPRISE'S MOST POWERFUL DIESEL



By far the biggest and most powerful diesel engine ever built by Enterprise Engine and Machinery Company of San Francisco, the new 16-cylinder RV-16 is equipped with Bendix* Fuel Injection. The development costs of this powerful diesel were over \$500,000. And, as usual when outstanding performance is a must, Bendix Fuel Injection is the logical choice.

*REG. U.S. PAT. OFF.

The RV-16 has a top rated capacity of 7,700 horsepower at 400 rpm. It is four-cycle, with a 17-inch bore and a 21-inch stroke. A turbocharged engine, fitted for dual fuel operation using Bendix equipment, it presents several advancements. Note master and link connecting rod, cylinder and head arrangement which permits removal of piston and connecting rod through the top. The manifolds, which require little service, are positioned inside. The V. Parts requiring service are on the outside, easily accessible.

Scintilla Division

Sidney, New York



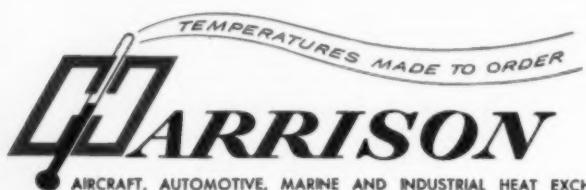
From General Motors...Temperatures made to order!



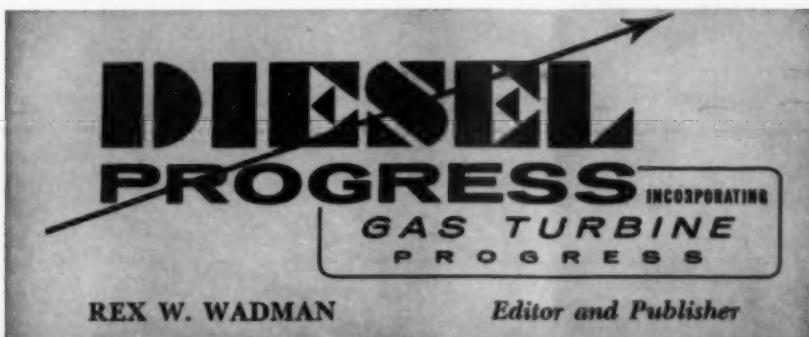
Harrison Heat Exchangers
—Top-Quality Products
of General Motors Re-
search and Engineering.

**HARRISON-COOLED GM DIESELS UNLOAD
HUGE 25,000-BARREL OIL BARGES!**

Pumping out this payload takes power and speed . . . and Harrison keeps the job flowing. Harrison-cooled GM Diesels keep pumps running with no downtime for heat problems. Rugged and reliable, Harrison heat exchangers keep an accurate check on vital engine temperatures. And every Harrison heat exchanger is backed by over 48 years' experience in the manufacture of top-quality heat control products. That's why you'll find Harrison on so many major jobs in industry and defense. If you have a cooling problem, look to Harrison for the answer.



HARRISON RADIATOR DIVISION OF GENERAL MOTORS, LOCKPORT, NEW YORK



IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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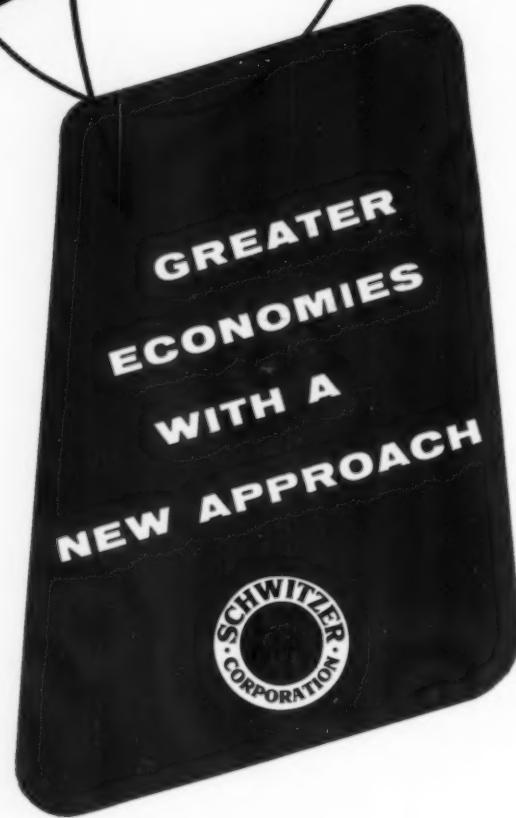
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FRONT COVER ILLUSTRATION

Canadian Pacific Railway's crack trans-continental daily, "The Canadian" swings through the Rockies powered by three 1500 hp diesel locomotives manufactured by General Motors Diesel Ltd. of London, Ontario.





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FAN BLADES • FAN DRIVES • OIL PUMPS • WATER PUMPS
HIGH EFFICIENCY FAN SHROUD ASSEMBLIES

Will your engine burn this goop?

Actual photo of a #6 residual fuel of the type burned regularly by two Enterprise Engines at the Municipal Power Plant, New Smyrna Beach, Florida.

ENTERPRISE Does —and saves this city up to **\$4200 per month in fuel costs!**

Here are facts of interest to any city that is thinking of using low cost residual fuels in engines for electric power generation.

Early in 1957, New Smyrna Beach, Florida put two DSR-38 Enterprise Diesels into operation generating 90% of its power load. They burn about 100,000 gallons of #6 residual fuel every month. *Both engines have now run on 80% average load continuously for over a year and a half without shutdown except for normal maintenance—with fuel savings as high as \$4200 per month!*

This performance is typical of *Enterprise* Diesels. For they are designed and built to permit the widest possible latitude in fuel use. You can now order your new engine fully equipped for burning residual fuels. Or your present *Enterprise* Diesel can be converted to handle heavy fuel by installing the necessary oil heaters and centrifuges. No change in the basic fuel injection system is required if it's an *Enterprise*.

To be sure your diesel will handle low cost fuels and still turn in maximum performance—*without expensive maintenance and downtime*, specify *Enterprise*—custom crafted by the engine people that have the heavy fuel experience—and know how to use it!



These two 2500 HP Enterprise Model DSR-38 Turbocharged Diesels have turned in record performance on heavy fuel operation. Simple *Enterprise* open-type combustion chamber design makes handling of heavy fuels easy and economical.



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Southern-Plaza equips 74 new Kenworths with Spicer 12-Speed Transmissions

"The Spicer Synchro-Master 12, with its .80 overdrive in 12th gear, is ideal for fuel-saving operation," states Edward R. Pecora, Vice President in charge of operations for Southern-Plaza Express, Inc., Dallas, Texas.

"Coupled to a Cummins NT4, through a Spicer 14" two-plate clutch, the Spicer Synchro-Master 12 gives us a road speed of 52 MPH at a governed engine speed of 2000 rpm. When cruising, we maintain the same road speed at only 1600 rpm simply by shifting into 12th gear to benefit from the .80 overdrive.

"We think we've achieved the ultimate in fuel-saving and engine-saving economy without sacrificing trip time. That's why we specified the Spicer transmission, with a weight-saving aluminum case, for all 74 of our new Kenworth tractors."

WRITE FOR FREE BOOKLET giving a complete description of the close-stepped, fully-synchronized Synchro-Master 12 Transmission. For added information, call the Dana Engineer.



Edward R. Pecora
Vice President - Operations

DANA CORPORATION • Toledo 1, Ohio

DANA PRODUCTS Serve Many Fields:

AUTOMOTIVE: Transmissions, Universal Joints, Propeller Shafts, Axles, Powr-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

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AVIATION: Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merrittton, Ontario.





No matter where it's bought...

Other outstanding Shell Industrial Lubricants

Shell Tellus Oils—for hydraulic systems
Shell Telone R Oil 40—anti-wear crankcase oil for diesel locomotives
Shell Alvania Grease—multi-purpose industrial grease
Shell Turbo Oils—for utility, industrial and marine turbines
Shell Dromes Oils—soluble cutting oils for high-production metalworking
Shell Macoma Oils—for extreme pressure industrial gear lubrication
Shell Volute Oils—for high-speed quenching with maximum stability

Its performance and name are the same around the world

Shell Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation.

Rimula® Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula Oil contains an alkaline additive that counteracts this

acid wear. It remains stable under the widest temperature extremes encountered in modern diesel operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worth-while savings in labor and parts.

For full information, write Shell Oil Company, 50 West 50th Street, New York 20, N.Y., or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

SHELL RIMULA OIL
the heavy-duty crankcase lubricant





6 NORDBERG DIESELS help keep the City of Carthage, Mo. debt-free

Well-run municipal electric plants are almost invariably associated with excellent service, moderate rates, and a substantial financial return to the municipality.

The Carthage Water & Electric plant, recognized as one of the outstanding municipal power plants in the nation, is an outstanding example of a debt-free, home-owned industry, that annually supplies over \$116,000 of free services to the City while maintaining lower prices for its product than its competitors.

The City of Carthage, Missouri has demonstrated the advantages of municipally-owned utility services since 1898. In 1920, when a 300 kw steam engine was carrying the load, surveys showed that future growth could best be met by expanding facilities and switching to diesel power.

Today, six big Nordberg engines, having a combined rating of 21,500 hp, 16,000 net kw, serve this progressive municipality.

©1953, N.M.C.

P459

Ward Chittenden,
Chief Engineer
(left) and Howard
Berry, Gen'l. Supt.
stand beside the
newest Nordberg
engine in the
Carthage plant, a
5900 hp, 4200
kw unit.

NORDBERG MFG. COMPANY • MILWAUKEE 1, WISCONSIN

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS
SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

Cast Steel Harness for 200,000 Horses



Here's one of twelve 44 ton cast steel half head covers used on six 200,000 HP hydro-electric turbines by an eastern power plant. These giant steel castings involved unusual foundry techniques in production.

The large bore core (9'6") was made integral with the mould, eliminating handling and setting extremely large cores. A segmental type pattern with a ring type riser on the cope side eliminated the cope portion of the mould. Directional and progressive feeding of the molten metal during the solidification period was made possible by slight design modifications promoting a sound homogeneous structure.

After stripping, the castings were subjected to hydro-blasting and arc-air method for excavating surface imperfections. Finally, rigid dimensional inspection was followed by magnetic particle and radiographic examination at critical areas.

Here, at Erie Forge & Steel, experienced engineers, metallurgists and craftsmen control quality every step of the way from raw materials to finished steel casting. Consult with us on your steel casting and forging requirements.

ERIE FORGE & STEEL CORPORATION
ERIE, PENNSYLVANIA

Here's why your fleet customers specify Purolator Air Filters as original equipment



"We've saved thousands of dollars in maintenance costs by preventing dirt damage to our engines," says Mel McLure, Shop Supt., Yellow Transit Freight Lines, Inc. He specifies Purolator dry-type air filters exclusively for Yellow Transit's fleet of 302 Kenworth line haul tractors.

This quote points out one way to increase chances of repeat business. Your engines will last longer in the field, and his maintenance costs and down-time will be cut sharply, when you've built Purolator dry-type Micronic® air filters into his diesels.

Here are some of the reasons why so many fleet operators insist on Purolator Micronic air filters as original equipment:

- They are more than 99% effective at all engine speeds.
- Their controlled porosity keeps all harmful particles from reaching the vital parts of the upper engine.

- They are easy to maintain and replace.

Think about these benefits when you consider Purolator air filters for original equipment in your own, standard line of diesels.

A Purolator engineer will be glad to show you how the advantages and economies of Purolator filtration, provided for your customers, can also be of benefit to you. Write or call for a demonstration. When you do, be sure to ask for the booklet, *Purolator Micronic Dry-Type Air Filters*.

Filtration For Every Known Fluid

PUROLATOR
PRODUCTS, INC.
RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA



Dale Hickerson, Walter Arnold (mechanic), Al Hancock and Don Bronson, regular drivers and crew of the Autocar—Hall-Scott Million-Miler.

HALL-SCOTT ENGINE LOGS 1,000,000 MILES ON \$544 OF REPLACEMENT PARTS

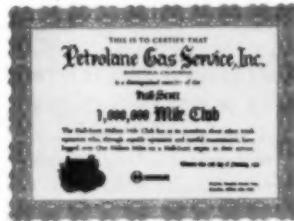
Million-mile service from a truck engine without major overhaul is unusual in itself. But when the cost of replacement parts for that mileage is only \$544, such service is a real tribute to the engine and the men who operate and maintain it.

No wonder Petrolane Gas Service, Inc. of Long Beach, California held a special dinner to honor the three drivers and mechanic who operated the Autocar truck and its Hall-Scott LPG power plant for 1,000,000 miles without a chargeable accident. In addition to its over-the-road mileage,

a third of which was on mountainous terrain, the truck's engine put in 3,564 hours on unloading pump drive for LPG cargo.

Many other Hall-Scott engines have passed the million-mile mark . . . and there will be many more. In fact, a unique Million-Mile Club has been formed of operators owning these long-serving power plants: note the certificate at left.

If you'd like to know more about these money-saving engines, write Hercules or any of its distributors coast-to-coast.

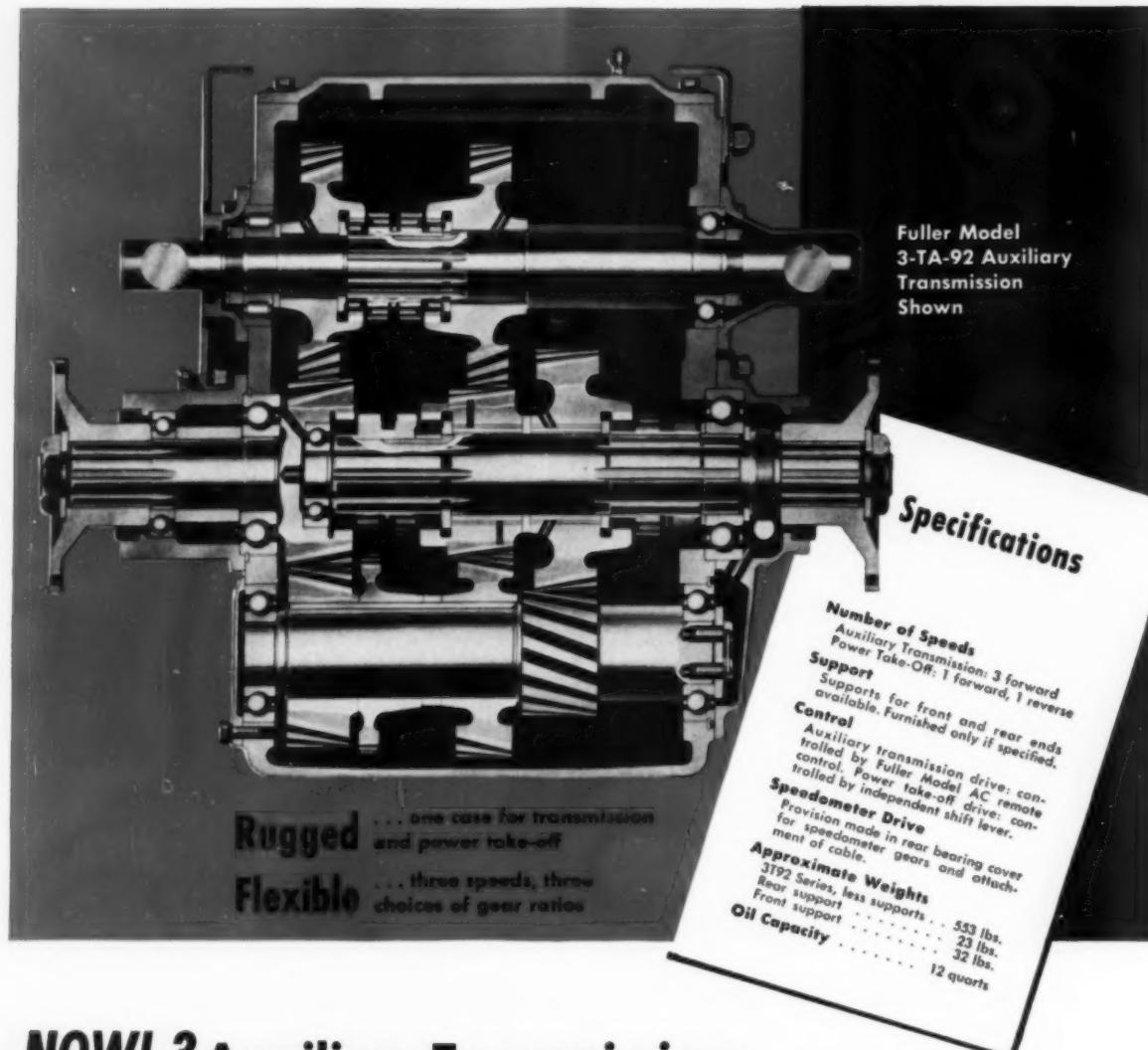


HERCULES ENGINES
... Sold and Serviced the World Over



HERCULES

HERCULES MOTORS CORPORATION
Canton, Ohio



NOW! 3 Auxiliary Transmissions with Built-In Power Take-Off

Splitting ratios . . . conventional steps . . . deep reductions . . . optional gearing needed for your operation plus the bonus of Fuller's built-in *Full Torque* power take-off.

Designed for exceptionally rugged service in all operations requiring a dependable Full Torque power take-

off, the Fuller 3T92 Series Auxiliary Transmissions offer a choice of three different sets of gear ratios.

Full engine torque can be applied through the Fuller 3T92 Series power take-off, because the gears and shafts of the PTO are installed in—not on—the transmission case. The PTO

provides both forward and reverse speeds, the ratios varying with the number of forward speeds available from the main transmission, and with the direction of shaft rotation.

Ratios now available in the Fuller 3T92 Series Auxiliary Transmissions:

Model Number:	3TA92	3TC92	3TD92
HIGH	.75	.75	.75
INTERMEDIATE	1.00	1.00	1.00
LOW	2.09	2.64	1.24

FULLER

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Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

ENGINEER'S FIELD REPORT

PRODUCT

RPM DELO OIL

FIRM

M. M. SUNDT
CONSTRUCTION CO.
Tucson, Arizona

RPM DELO OIL ends 5 years of engine troubles

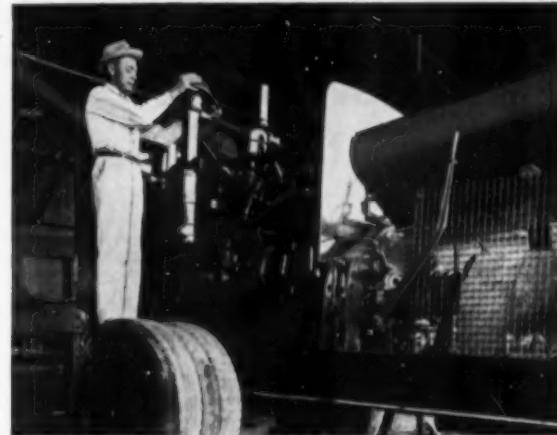


The pan has never been off the Caterpillar D7 engine of this Link-Belt Speeder shovel in 7 years, using RPM DELO Oil. Only repair was a single valve job—no other parts replaced. William Naumann, Sundt's Operations Manager, says, "We tried nine different major brands of oil in five years, trying to lick the frequent breakdowns that slowed our operations. Sometimes, main and rod bearings even froze solid on the crankshaft. We changed to RPM DELO Oil seven years ago, and, since then, have never had any engine troubles due to oil failure. We now use RPM DELO Oil exclusively in our 22 heavy-duty engines."



For More Information on this product contact your Standard Engineer or Representative, or write Standard Oil Company of California, 225 Bush Street, San Francisco 20, California

TRADEMARK "RPM DELO" AND DESIGN REG. U.S. PAT. OFF.
STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey



Lubricated with RPM DELO Oil, this Caterpillar D 13000 portable unit powered a rock crusher of M. M. Sundt Construction Co. for a total of 8976 hours before overhaul. "In spite of extremely dusty conditions the only time the engine was touched was to replace a head—no other repairs were necessary," reports master mechanic Billy Gray, shown replacing air cleaner on unit following overhaul.



Austin 101 rock crusher, powered by Caterpillar unit described above, works 20 hours a day at firm's materials stockpile outside Tucson. Company works year around on road paving, grading, foundations, building construction.

Why RPM DELO Oils reduce wear —prolong engine life



- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearings
- Inhibitor resists crankcase foaming

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Michigan-Ohio News

By Jim Brown

R. G. MOELLER Co. of Detroit reports that in commemoration of Austin-Western's recent 100-year anniversary the company has changed the model number nomenclature of their diesel-powered graders as follows:

Former Name	Current	Engine
88L	Pacer 100	GM Diesel
Super 88	Super 100	GM Diesel
99L	Pacer 300	GM or IH diesel
Super 99	Super 300	GM or IH diesel

In addition to this, Austin-Western has brought out two new graders, the 21,478 lb. Pacer 200 and the 21,509 lb. Super 200. The Pacer 200 and the Super 200 are powered by a GM 3-71 Detroit Diesel. Future plans call for the production of 2 new A-W graders later in the season. The smaller of these two (in the 400 series) will weigh 25 to 27 thousand lbs., and will be powered by either

GM or Cummins diesel, at customer's option. The other grader (in the 500 series) will weigh approx. 30,000 lbs, and will be powered by one of GM Detroit Diesel's new "Vee" type diesel engines.

GRAND RAPIDS branch of Wolverine Tractor and Equipment Co. recently delivered an International TD-20 crawler tractor equipped with hydraulic bulldozer blade to St. Joseph County Road Commission located at Centreville, Mich.

NEW engine in the Cummins diesel engine line, called an NH 180 and rated at 180 hp, has been installed by Cummins Diesel Michigan Inc. of Dearborn, Michigan in a GMC model HDCR 752 truck. Frizzell Cartage Co. of Detroit, will break in the new engine which, incidentally, is the first diesel in their fleet of trucks.

WILLIAM Zelting & Sons of Grand Rapids, Mich. have accepted delivery on a model HD6E Allis Chalmers diesel tractor. The new tractor is equipped with a model 6DE hydraulic dozer blade and was purchased from Earle Equipment Co. of Detroit.

FISHER Sand and Gravel Co. of Midland, Mich. has accepted delivery on a Pettibone-Mulliken model 250 front-end loader equipped with 20.5 tires and 3 1/4-
yd bucket and powered by a GM model 4-71 Detroit Diesel engine. The new loader was delivered by Cyril J. Burke, Inc. of Detroit and will be used by the Fisher Co. to load sand and gravel into trucks at their gravel pit.

R. G. MOELLER Co. of Detroit has announced that their John Deere model 440IC dozers and front end loaders are now available with the new GM model 2-53 Detroit Diesel engine.

BUCYRUS-ERIE model 30B Hoe equipped with an International UD 525 diesel engine and 1-
yd bucket was recently purchased by Dale DeWitt of Flint, Mich. Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids made the sale.

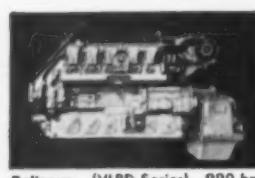
EUGENE Block of Detroit has accepted delivery on a model OC-4-3-42 Oliver crawler tractor equipped with hydraulic dozer blade and powered by a Hercules diesel engine. The new crawler was sold by Cyril J. Burke, Inc. of Detroit, distributors of Hercules diesel engines in Michigan.

MARION Power Shovel Co. announces the addition of a new 45-ton wagon crane to its line of excavating machinery. Designated the Type 362 Wagon Crane, it can carry up to 120 ft. of boom and 15 or 20 ft. jibs for added

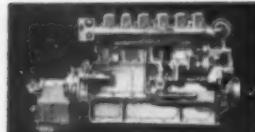
WAUKESHA Diesel

MARINE ENGINES up to 990 hp

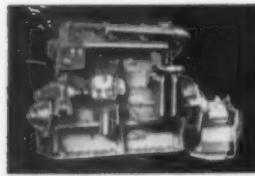
- Easy Starting
- Safety • Simplicity
- Smoothness • Economy



Reliance (VLRD Series) 990 hp



Defender (LRD Series) 510 hp



Wanderer (NKD Series) 315 hp



Resolute (WAKD Series) 290 hp



Vigilant (148-D Series) 195 hp



Cutwater (135-D Series) 120 hp



BERYL
70-ft. work boat.
Powered by two
Waukesha turbocharged
"DEFENDERS."
Installation by
Precision Parts Corp.,
Nashville, Tenn.



MICHELE A. DeFELICE
80-ft. steel tug. Powered by
two Waukesha turbocharged
"DEFENDERS." Installation by
Reagan Equipment Co.,
New Orleans, La.



CAPT. MARIE
65-ft. twin screw tug.
Powered by two
Waukesha turbocharged
"WANDERERS."
Installation by
Waukesha Sales
& Service
Houston, Texas.

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MOTOR COMPANY**
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New York • Tulsa
Los Angeles
•
Factories: Waukesha, Wis.
and Clinton, Iowa
*Write for
detailed descriptive
bulletins*

Engine Model	Engine Type	No. Cyls.	Bore and Stroke	Displ. Cu. In.	MAXIMUM RATING 24-Hour Duty
RELIANCE	Normal	12	8 1/2 x 8 1/2	5788	665 horsepower @ 1215 rpm
	Turbo	12	8 1/2 x 8 1/2	5788	990 horsepower @ 1215 rpm
DEFENDER	Normal	6	8 1/2 x 8 1/2	2894	335 horsepower @ 1215 rpm
	Turbo	6	8 1/2 x 8 1/2	2894	510 horsepower @ 1215 rpm
WANDERER	Normal	6	7 x 8 1/4	1905	240 horsepower @ 1215 rpm
	Turbo	6	7 x 8 1/4	1905	315 horsepower @ 1215 rpm
RESOLUTE	Normal	6	6 1/4 x 6 1/2	1197	195 horsepower @ 1600 rpm
	Turbo	6	6 1/4 x 6 1/2	1197	290 horsepower @ 1600 rpm
VIGILANT	Normal	6	5 1/4 x 6	779	150 horsepower @ 1800 rpm
	Turbo	6	5 1/4 x 6	779	195 horsepower @ 1800 rpm
CUTWATER	Normal	6	4 1/4 x 5	426	100 horsepower @ 2000 rpm
	Turbo	6	4 1/4 x 5	426	120 horsepower @ 2000 rpm

versatility in crane work.

JACK Fitzsimmons of Caldonia, Mich. has purchased an International model TD-6 crawler tractor equipped with hydraulic bulldozer blade. The sale was made by the Grand Rapids branch of Wolverine Tractor and Equipment Co.

STARK Brothers of Erie, Mich. have accepted delivery on a 1 1/4 yd. P&H dragline, powered by a P&H model 687C-18 2-cycle diesel engine. The new dragline was purchased from the J. R. Panelli Equipment Co. of Detroit and will be broken in on a highway project in South Bend, Ind.

OAKLAND County has ordered their 6th Pettibone-Mulliken model 125 loader from Cyril J. Burke, Inc. of Detroit. The new loader is equipped with a 1 1/2 yd bucket and powered by a model 339 Hercules diesel engine.

UNION Construction Co. of Manchester, Mich. has accepted delivery on an International TD-9 Drott loader. Sale was made by Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids.

A P&H model 455C 1 yd. backhoe powered by a P&H model 487C-18 diesel engine was sold to E. A. Russell Contracting of Mt. Clemens by J. R. Panelli Equipment Co. of Detroit. This model 455C is a machine of brand new design by the Harnischfeger Corp., and is the first one in metropolitan Detroit.

C. F. ANDREAE, president of Peninsular Diesel, Inc., Detroit and Grand Rapids has announced increases and changes in their sales force. Henry Vann, formerly of Detroit Basin Co. will cover the northeastern part of Michigan for Peninsular. Carl Prutow has been added to Peninsular's force as application consultant. Willard Young, who has been representing Peninsular in the eastern part of Michigan for the past year, will now cover the lower southeastern portion.

C. F. ANDREAE, president of Peninsular Diesel, Inc., Detroit and Grand Rapids, has announced that they have been appointed distributors for General Motors Diesel marine engines, in addition to their former line of G. M. industrial, petroleum and truck engines.

ALLIS-CHALMERS model HD6E diesel tractor equipped with a model 6DE dozer blade was recently purchased from Earle Equipment Co. by Fill Sand, Inc., of Centerline, Mich.

CUMMINS Diesel Michigan Inc. of Dearborn, Mich. has installed a model JNS-6-BI Cummins diesel in a Mack

B-43 tractor. The installation was done for John B. Smith of South Haven, Mich. Mr. Smith hauls freight for Wolverine Express Co. at Muskegon, Mich.

CUMMINS Diesel Michigan Inc. of Dearborn, Mich. has installed a 175 hp Cummins HR-6-BI diesel in an Allis Chalmers TS-200 scraper unit for A. F. Loeffler Co. of Davison, Mich.

NORM Covell of Samaria, Mich. has accepted delivery on a new Allis-Chalmers model TS-160 Motor Scraper. Sale was made by Earle Equipment Co. of Detroit.

New Generator Brochure

Product publication 2100-PRD-254 describes a line of non-packaged synchronous generators manufactured by Electric

Machinery Mfg. Co. The line of high speed generators described is available in ratings of 187 kva and larger. Built in either single or three phase ratings, the machine will operate at either 60 or 50 cycles. Single or two bearing construction are also available. Copies of the publication are available; requests should be directed to Electric Machinery Mfg. Co., Minneapolis 13, Minn.

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- Sure, split-second starting—even in sub-zero weather
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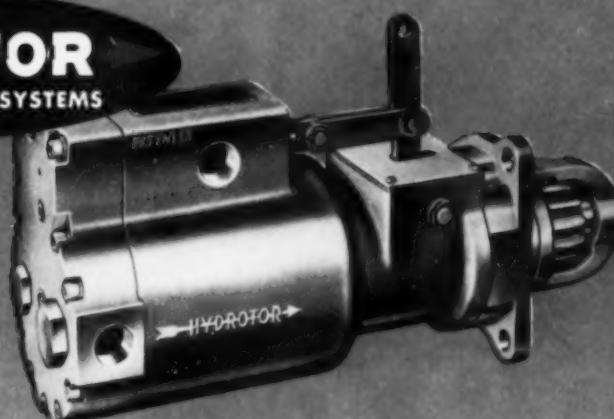
Here's a proved cranking system that spins engines 2 to 3 times faster—in torrid heat or freezing cold. It's the American Bosch HYDROTOR—the hydraulic cranking system that puts real muscle into engine cranking—eliminates battery and starter troubles, reduces down-time expense—saves you real money on maintenance and repairs.

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revolutionary system that uses oil under high pressure to crank diesel or gasoline engines *faster with greater power*. You'll want the outstanding performance and dependability—the economy of HYDROTOR for your engines. Send today for free brochure H110-02-2 and the name of your nearest Hydrotor distributor. American Bosch Division, American Bosch Arma Corporation, Springfield, Mass.

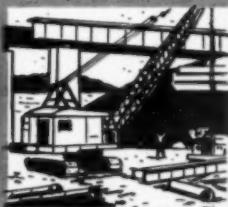
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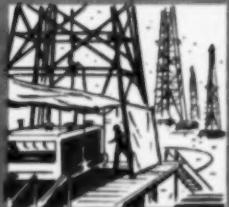
FOR CONSTRUCTION



FOR TRUCKING



FOR MARINE USE



FOR OIL FIELDS

AMERICAN BOSCH ARMA CORPORATION

Eastern Diesel Topics

By Robert Dymont

A 100 ft. tug is to be built by Blount Marine Corp., Warren, R. I., for the Providence Steamboat Co., Providence, R. I. In many respects the tug will be similar to Providence Steamboat's tug *King Philip*, which was built at the yard

in 1956. She will have one more foot in beam—26 ft. instead of 25 ft., and will have 200 hp more than her sister ship. Power will be supplied by an 1800-hp Fairbanks-Morse diesel engine model 38D81/8.

BUREAU of Streets of the City of Worcester, Mass., has purchased a Galion grader, Model 160, from the E. J. Bleiler

Equipment Company, Needham, Mass. It is powered by Cummins 6-cyl., 4-cycle diesel engine and has been used for plowing snow and in removing ice from the city streets.

C. O. VANTANT has been appointed distributorship manager of the Bronx, N. Y. distributorship of the Cummins Engine Co., Inc. Mr. Vanzant joined the Cummins organization as a sales representative in June of 1957 and later was appointed branch manager at Little Rock, Ark.

TWIN-SCREW river towboat *Merchant Prince* has been delivered to the newly formed Western Navigation Co., Pittsburgh, affiliate of Continental Ore, Inc., New York. This was Hull No. 3948, a vessel of about 600 gross tons, propelled by twin General Motors Diesels developing 3200 bhp total. It is 148 ft. long, 34 ft. beam, 10 ft. 6 in. depth.

AVON by the Sea, N. J., depends on a Caterpillar D318 Electric Set (60 kw continuous duty) as an emergency unit in its sewage plant. Treatment tank capacity is 11,526 gal. Equipment can handle two 1,000 gpm pumps.

CANADIAN National Railways took delivery recently of the first GMD-1, a newly-designed branch-line diesel-electric locomotive. This unit was completely designed and engineered by GM Diesel Ltd., London, Ontario. The new versatile locomotive was developed to meet the low axle load requirements of branch line operation under Canadian conditions. Also, to provide a locomotive for road switching and passenger service when equipped with a steam generator. The 1200 hp GMD-1 features light axle loading, high speed and rugged construction.

LITTS Construction Co. of East Stroudsburg, Pa., recently purchased a Cat D-4 from Cleveland Brothers Equipment Co. of Penn. for work on a dam-building job in Swiftwater, Pa.

KEYSTONE Diesel Engine Co., Inc., Wexford, Pa., announced that it has been appointed distributor for General Motors Diesel Engines in thirty-one counties in Western Pennsylvania. Offices for sales, service and parts are located on U. S. Route 19, 14 miles north of Pittsburgh. Keystone will sell and service GM Diesel engines of the following types: industrial, petroleum, marine, trucks and Hydro-Starters.

RECENTLY the Atlanta Gas Light Co. put on the line just north of Marietta, Ga. a skidmounted, Worthington 575 hp SLHC-6 angle gas engine compressor package engineered by the A. M. Lockett Co., New Orleans. It handles natural

gas at a suction pressure of 70 psig and delivers at 190 to 275 psig, depending on demand. Because of this great variation in discharge pressure and capacity, four of its six compressor ends have diaphragm-type suction valve unloaders. Center cylinder is loaded at all times. Once desired pressure is determined, the unit automatically loads or unloads one or more compressor ends to give correct capacity. The engine also automatically varies between half and full speed within each unloading step, thus giving an infinite number of capacity steps at any discharge pressure between 190 and 275 psig.

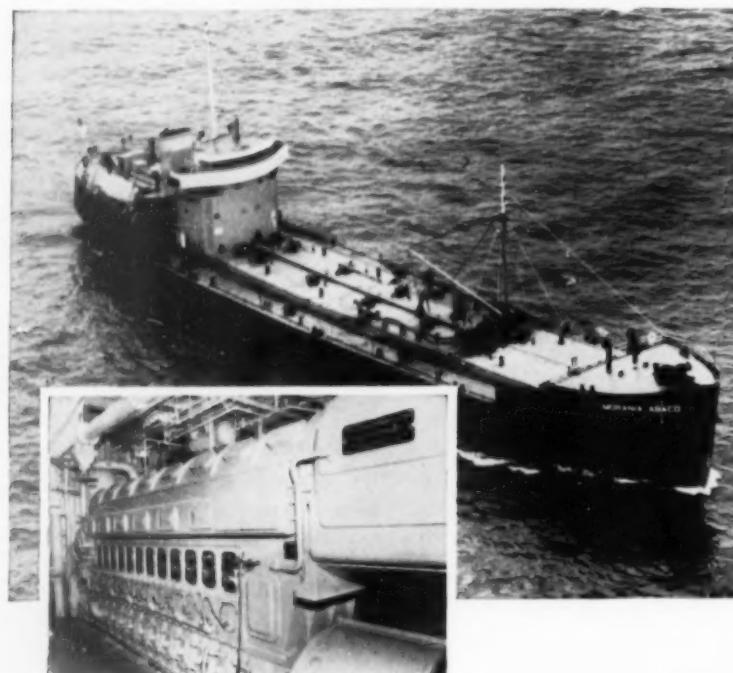
ONE of the most powerful harbor tugs in the United States, squat, pugnosed *Kings Point* is powered by a 2100 hp Alco diesel. The *Kings Point* operates out of Baltimore for the Curtis Bay Towing Company, Baltimore, Md.

A tug-building contract has been awarded to Dravo. Pennsylvania Railroad has awarded contract calling for construction of seven Diesel tugs to Dravo which, heretofore, specialized in towboat and barge construction. The vessels will measure 105 ft. by 26 ft. and be powered by 1,200 hp diesels. The first unit is to be delivered in September. The remainder will be completed at a rate of one tug every 3 weeks thereafter, with delivery shortly after completion.

Roberts New Enterprise Los Angeles Manager

Mr. Jack L. Roberts has been promoted to Los Angeles District Manager of Enterprise Engine & Machinery Co. Mr. A. W. Ostrander, vice president for sales of General Metals Corp. and general sales manager of the subsidiary Enterprise, announced the promotion upon the retirement of H. R. Hogboom from the management of the Los Angeles office. Mr. Roberts, an 18-year man with Enterprise, is already well known in Los Angeles from a previous assignment as a field sales engineer in that area. Following many months of diesel development work for Enterprise, he became assistant manager of the Process Machinery Division. Following his transfer to engine contract engineering he was promoted to a field sales engineer. He majored in engineering at the University of California.

READY TO MAIL MAY 15!! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.



Fairbanks-Morse O-P Power gives the new "Morania Abaco" high-performance for hot cargo!

Capable of delivering 17,700 barrels of asphalt at 350°F. anywhere on the East Coast or in the Gulf, the new O-P powered *Morania Abaco* has literally revolutionized the asphalt industry. Time is saved; packaging, shipping and labor costs are cut to the minimum.

For compact power, and economy, a 12-cylinder Fairbanks-Morse Opposed-Piston diesel was selected for the

Morania Abaco, developing 2000 hp. at 800 rpm. O-P performance gives her the extra speed and efficiency that adds to her effective operating range. Whether you're building new or repowering, call in your nearby Fairbanks-Morse Marine expert. F-M O-P diesels range from 300 to 3000 hp. Write Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.

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DIESEL, DUAL FUEL AND GAS ENGINES • LOCOMOTIVES • ELECTRIC MOTORS • GENERATORS
PUMPS • SCALES • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

Mid-West Diesel News

By L. H. Houck

PITLICK & Wick Const. Co., Eagle River, Wis., has repowered a Cedar Rapids crusher with a GM 6031C diesel from Inland GM Diesel, Inc., Milwaukee.

CATERPILLAR D4 to Kenneth Bryant, Mountain Home, Ark., from E. A. Martin branch at Harrison, Ark.

CUMMINS 175 hp, JT-6-B to Roy Stein, Denver, for repowering a White 9000TD from Cummins Diesel Sales Corp., Denver.

CENTRAL Wis. Petroleum Transportation, Marshfield, Wis., has installed a Cummins 175 hp JT-6-B in an International RD-205. Engine was delivered by Cummins Diesel of Milwaukee, Inc.

SWEENEY Brothers Tractor Co., Fargo, North Dakota, has installed a generator set in St. Ansgar's Hospital, Moorhead, Minn., which opened Feb. 21. Power was a 4-71 GM diesel direct connected to a 60 kw Kato generator. Sweeney distributes industrial, mining, municipal and construction equipment in addition to GM engines.

ANNA Quarries, Inc., Anna, Ill., recently put two new 10-ton Koehring Dumptors in service from Allied Machinery, St. Louis. Units are powered with 6-71 GM diesels. They operate 5 other 5-ton Dumptors powered with 4-71 GM engines.

TWO D6 Caterpillar tractors from E. A. Martin at Harrison to J. C. Gladden, Huntsville, Ark., for use in contracting and land clearing operations.

MORTENSON Bros., Aniwa, Wis., Cummins NH-6-BI for installation in International truck, from Cummins Diesel of Wisconsin, Milwaukee.

CUMMINS JT-6-B to A. C. Elliott, Evansville, Ind., for installation in a rebuilt IHC CO-205 chassis. Engine delivered by Cummins Diesel Sales, Inc., Evansville.

NORTHWESTERN Railroad, Chicago, took delivery on a Cummins VT engine from Cummins Ill. Engine Sales, Chicago, for installation in a locomotive.

INGERSOLL-RAND Crawl-IR blast hole drill and 600 cfm air compressor with 6-71 GM diesel, to Anna Quarries, Inc., Anna, Ill., for drilling blast holes in rock quarry.

TWO Caterpillar No. 12 motorized road graders to Boone County, Ark., from E. A. Martin Machinery Co., Harrison.

This makes a total of 6 No. 12 Caterpillar graders for the county and a new D6 tractor.

CUMMINS NHS to William Hardesty, Henry, Neb., for installation in a Freightliner, from Cummins Diesel Sales Corp., Denver.

INLAND GM Diesel, Inc., Milwaukee, delivered a Detroit diesel Model 4055C to Aring Equipment Co., Inc., for installation in an Austin Western motor grader.

MATCHED pair GM-6-71 marine diesels to Burger Boat Co., Manitowoc, Wis., for installation in a pleasure craft. Inland GM Diesel, Inc., Milwaukee, made the delivery.

HANK PRUTCH, Dubuque, Ia., has installed a Cummins NHS diesel in a Kenworth. Sale by Cummins Diesel Sales, Inc., St. Paul.

TWO Cummins NH-180's to Dohrn Transfer, St. Louis, for installation in IHC AC-225-DA's, from Cummins Mo. Diesel Sales Corp., St. Louis.

MIDWEST Transfer Co., Chicago, has installed two NH-220 Cummins diesels in IHC DCOF-405's, from Cummins Illinois Engines, Inc., Chicago.

MARTIN Oil Service, Blue Island, Ill., three NH-180 Cummins diesels for repowering Diamond T 923B units. Sale by Cummins Illinois, Chicago.

INLAND GM Diesel, Inc., Milwaukee, has delivered a GM 2-71 Model 2030C to Sturgeon Bay Shipbuilding & Dry Dock Co.

New Daros Data Book

Daros Piston Rings have just published a new data book on their full line of piston rings, piston rod packings and cylinder liners for diesel engines. The literature gives a complete description of the many types of rings the company manufactures for every make and model of foreign and domestic diesel engines. Literature is available from Piston Products, Inc., 8128 N. Lawndale Ave., Skokie (Suburb of Chicago), Ill.

ITS NEW

Detroit Diesel Names Dixie Engine Co.

The Detroit Diesel Engine Division of General Motors has appointed the Dixie Engine Co. of Atlanta distributor for GM diesel engines in Western Georgia. The appointment is in line with the Division's newly established policy of distributing its products through outlets that are exclusive "engine houses".

President of the new company is J. P. Jung who has long been associated with the Diesel engine industry in Georgia. Mr. Jung has established temporary quarters for the company at 271 Boulevard, N. E. in Atlanta pending completion in May of a new building now under construction. The new building will also be in Atlanta at 3899 Tuskegee Ave., S. W. With 12 years experience in the

application and servicing of diesel engines, Jung has planned for one of the most modern structures yet to serve power requirements in the trucking, construction, industrial and allied fields. The Blalock Machinery and Equipment Co. who has served GM diesel as distributor in Georgia for many years, will continue to operate as a GM diesel service dealer both in Atlanta and Albany.

HC HORIZONTAL CORE

UNIT by Young

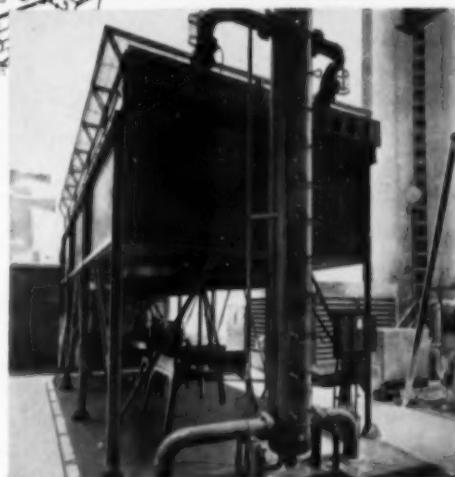
SIMPLIFIES COOLING of POWER UNITS

on Giant Offshore Drilling Barge...



Placid Oil Drilling Barge Operates in 106' of Water, off Eugene Island, La., U.S.A.

Closed fresh water system cools 8 500 hp Diesel Engines in Constant Operation



Every possible Young Quality advantage has been built into the cooling system of the power units of this Placid Oil Company's 8750 ton drilling barge. The eight 500 hp Diesel engines which generate all the required AC and DC power have a consolidated cooling system piped into a compact, efficiently designed Young H-C 2610 Horizontal Atmospheric Cooler. As in many installations, continuous operation is a must; downtime is costly and cannot be countenanced. All components are designed for maximum efficiency and rugged dependability... to give continuous performance twenty-four hours a day.

Each installation is treated as a separate cooling problem by Young Heat Transfer Specialists. If you have a Heat Transfer Problem, or if you are anticipating one, consult with Young representatives. No obligation, of course.

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2. Flournoy & Everett, Inc. Downey, California
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6. Dutton-Williams Bros. Ltd. Calgary, Alberta, Canada
7. H. J. Young Muskegon, Mich.

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More horsepower for the new Caterpillar D8 tractor



AIRESEARCH
T-1404
TURBOCHARGER

*Turbocharger system specifically
designed for big Series H tractor*

A joint development of Caterpillar and AiResearch, the turbocharger system is an integrated part of the new D8 Series H tractor. Extensive field tests showed an increase of 20% in bulldozing and a substantial gain in pushloading production with the Series H...brought about by the

tractor's greater horsepower, faster torque rise, greater weight and faster dozing and reverse speeds.

Specifically designed to match the new tractor's requirements, the new turbocharger underwent thousands of test hours on the new D8 operating in every kind of material on every kind of job.

AiResearch turbocharger advantages include: increased horsepower, improved lugging ability, cooler exhaust temperatures, reduced maintenance costs, less smoking and noise. This is another application of AiResearch turbochargers to heavy industrial machinery.



THE GARRETT CORPORATION

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DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

CANADIAN RAILROAD PROGRESS

By JOHN S. PEACH

THE year was 1925. A Saskatchewan farmer, John Manyluk, waiting at a prairie level crossing, whitened his knuckles as he hung onto the reins of his nervous team of horses. Unbelieving, he watched an ungainly railway car all by itself clatter along the Canadian National Railways' main line and disappear into the west with a roar and a cloud of ballast dust. The car was Canada's first diesel rail car, and John Manyluk by no means was the only astonished Canadian to see this brain child of the late C. E. Brooks, chief of motive power for the Canadian National Railways. The rail car proved the theories of its inventor by making a successful run between Montreal and Vancouver—a trial trip of 2,930 miles in 56 hours and 55 minutes.

Next, Brooks and his mechanical engineer colleagues in the C.N.R. set about designing the first diesel-electric road locomotive in North America. Four years later, in 1929, the Canadian Locomotive Co., Limited of Kingston, Ontario produced for them, a back-to-back pair of slab-sided vehicles which somewhat resembled the electric locomotives of the day. The double unit was given a single number: 9000, and made its first official run on August 26, 1929. Powered by Beardmore diesels which had proved highly successful on trial runs, 9000 was placed at the head of Canadian National's crack International Limited where, during the inaugural run from Montreal to Toronto, crowds gathered at every station to watch the history-making passage of what was then the world's largest and most powerful diesel-electric! In due course the double unit was split and numbered separately. Unit 9001 was retired in 1939. Unit 9000 lived to take part in World War II, for in 1941 it was commandeered by the Government and covered with armor plate and colored to resemble a box car. With a new engine, it was sent to British Columbia where it pulled an armored train as a defense measure along coastal lines. Returned to "civilian life" at the war's end, 9000 put in a further busy 15 months in passenger serv-



The Canadian National Railways' crack trans-Canada daily passenger express "The Super-Continental" near Jasper, Alberta. One of 16 matched units in service across the country each day is pulled by a pair of General Motors Diesel Ltd. units. The matching A and B (GPA-17c & GBP-17c) units are of 1750 hp each, with a maximum road speed of 83 mph.

ice in eastern Canada before it too was retired. It did not last quite long enough to greet in service, in mid-1948, a new streamlined 9000, the first of five 1500 hp General Motors Electro-Motive units delivered to the C.N.R. for fast freight service between Toronto and Montreal.

So began the great switch-over, and soon the horn and the roar of the diesel locomotive became familiar new sounds in nearly every part of Canada. Besides the needs of the Canadian National Railways which operates 33,046 total miles in all ten Canadian provinces and in eleven States south of the 49th Parallel, there was the appetite of the Canadian Pacific Railway for new diesel-electric power. The author made the inaugural run, in December 1949, aboard the first streamlined passenger diesel to go into service in Canada. It was an EMD E-8 of 2250 hp, the 130th diesel unit to go into service on the Canadian Pacific system, and was assigned to the Montreal-Boston Alouette and Redwing trains. By that time, the Esquimalt & Nanaimo Railway, a Canadian Pacific subsidiary on Vancouver Island in the west coast province

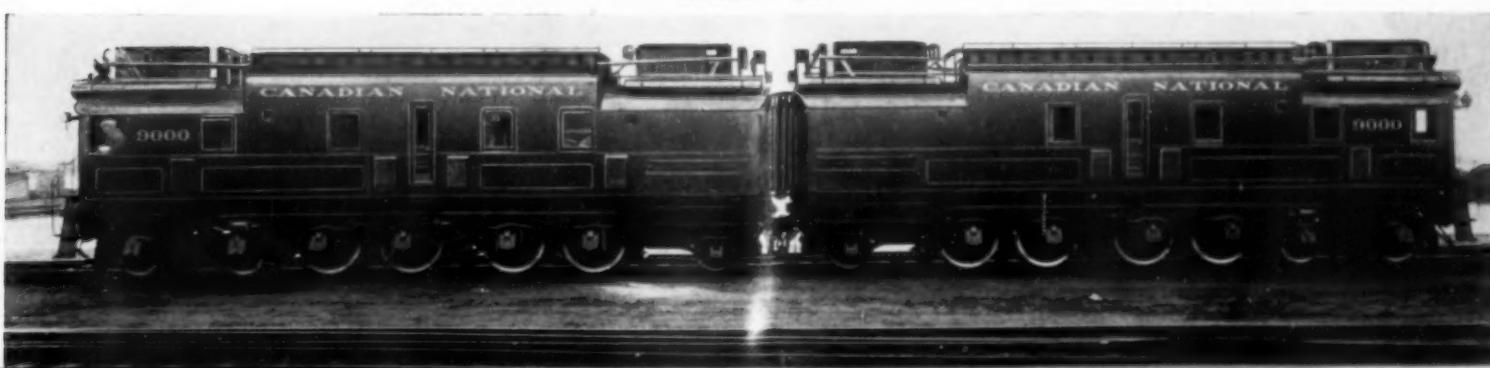
of British Columbia, had been completely dieselized. Almost coincidentally with this, the C.N.R. converted its Prince Edward Island service entirely to dieselize power.

The Canadian Almanac and Director lists 31 railroads in operation in Canada and into the northern fringes of the United States in 1958. These roads employ a total of 5,064 locomotives and, as of September 30, 1958, were using a total of 2,686 diesel-electric locomotives above 90 tons' weight. But in view of the fact that the two major roads alone had on order for 1958 a total of 328 new units and are retiring steam locomotives each week, that figure is obsolete before it can be recorded. Additionally, during the past few months, perky little diesel-hydraulic yard engines of 500 hp and about 89,000 lbs. weight are appearing in yard service in the tuscan red, focal yellow, and black of the Canadian Pacific railway.

A survey of the railroads of Canada reveals the interesting fact that all major manufacturers of diesel-electric power seem to have a share in the

Canada's first diesel-electric road locomotive, designed by C. E. Brooks, chief of motive power for the Canadian National Railways and built by the Canadian Locomotive Company, Kingston, Ontario. Powered by 2 Beardmore diesel engines of 600 hp each, it was delivered in 1929.

19



market. The J. G. Brill Company appears to have been a pioneer entrant into the many-sided competition for Canadian orders. In 1929, the Canadian National Railways was using a little 500 hp Brill unit on its subsidiary system, the Grand Trunk Western Railroad. Canadian Westinghouse was another early entrant, also a C.N. supplier, with a real lightweight—a 380 hp locomotive—built in collaboration with the Canadian Locomotive Co. and delivered for service in 1930. Thereafter in fairly quick succession, other makers appeared: Alco; EMD; General Motors Diesel Ltd., which was established and placed into production in an astonishingly short space of time; Canadian Locomotive Co., Ltd., which began diesel production with the Consolidation line using opposed-piston engines created by Fairbanks-Morse & Co. Then too, there was the Montreal Locomotive

ing proposition for the D.A.R., and have boosted passenger traffic 20 per cent. Running time on the route has been shortened by about four hours. An actual cost comparison reveals that the Dominion Atlantic has cut its passenger operation from one of about \$3.00 per mile to about 80¢ per mile, with all space on Dayliners devoted to passengers.

By 1950, the Canadian National Railways had 27 diesel-electric rail cars in daily passenger service in various parts of Canada. Since then, as in the case of the Canadian Pacific Railway, route after route has been dieselized as RDC's have proven their superiority at specialized tasks. The C.N. calls the RDC cars Railiners, and the Canadian Pacific labels them Dayliners, but regardless of name, these stainless steel Budd cars are luring traffic back from bus and airline, restoring lost passenger

The all-passenger Canadian Pacific Railway RDC Dayliner crosses the Nith River at Ayr, Ontario at high speed during its weekday run between Toronto and Detroit.



October 2, 1958, Fort St. John, British Columbia. Three Pacific Great Eastern Railway road switchers, controlled by micro-wave, enter Fort St. John abreast marking the completion of the road from tidewater on the Pacific coast at North Vancouver, 727 miles away, to the northeastern interior of the province of British Columbia.

Works, another long-established Canadian maker which began diesel-electric manufacturing in 1948 and in two years had switched its complete output to diesels, and the famous locomotive firm of Baldwin which built a variety of units for the Canadian Pacific Railway.

By August 1, 1958, the Canadian National had 1,595 diesel units in service, the largest total of any Canadian road. Of its total freight locomotive miles in 1957, 62.93 per cent were diesel, and of its passenger locomotive miles, the diesel percentage was 46.19. Some of the smaller roads are completely dieselized, such as the Quebec, North Shore, and Labrador Railway which hauls a prodigious quantity of iron ore from deposits in the northeastern wilderness of Quebec to tidewater on the Gulf of St. Lawrence. One of the smaller roads undergoing dieselization is the Dominion Atlantic Railway, a C.P.R. subsidiary in Nova Scotia. Two 90-passenger Rail Diesel Cars (RDC) Dayliners as they are called—have replaced steam powered passenger trains on the 201-mile Halifax to Yarmouth main line. Travelling more than half a million miles during the past two years, the two RDC's have cut operating expenses more than two-thirds, have turned a floundering passenger business into a pay-



Two Canadian National Railways Road Switchers are seen here hauling a train-load of large diameter steel pipe for the Trans-Canada natural gas pipeline being built from Alberta to Ontario. They have a maximum road speed of 65 mph and weigh 247 tons.

revenue to the railroads, and are racing across the landscape like bright bobbins weaving an entirely new pattern of surface passenger transportation. It is not hard to find proof of the RDC's splendid role: Twenty years ago, the C.P.R.'s day train used to take 6½ hours to trundle along the 208-mile route between Calgary and Edmonton in the province of Alberta. Before World War II equipment changes reduced the time to 5½ hrs. Today, diesels make it in 3½ hrs.





Even more spectacular than the 50-mile-an-hour average hauls across the western prairies and the more settled rolling countryside of Ontario and Quebec, is a comparatively new Dayliner service between Medicine Hat, Alberta and Vancouver, British Columbia. The route parallels the International Boundary, and weaves through and over the Crowsnest Pass, five mountain ranges, and the Coquihalla Pass. It is a notoriously roller coaster run, ideally challenging to an RDC. With space for 70 passengers as well as express and baggage, the stainless steel cars hustle over the two-stage haul of 962.6 miles, clipping no less than 11 hours' running time from the old steam schedule. So for one reason or another, the railroads continue to recruit the services of the latest in diesel-electric equipment to help cut costs and to raise levels of

Canadian Pacific Railway's Dayliner service—trains 359 and 360 span the distance between Toronto and Detroit in 4 hours and 25 minutes. Here, RDC-1 #9023 coupled to an all-passenger RDC-3 leaves the station at Windsor, Ontario.

efficiency of operation. The Ontario Northland Railway, for instance, retired its last steam locomotive in June 1957, and now has 48 diesels of all types in service on its 566 miles of line. These locomotives, providing a degree of trouble-free service hitherto unknown by the road, accumulated in 1957 a total of 572,138,952 freight ton-miles and over 25½ million passenger miles.

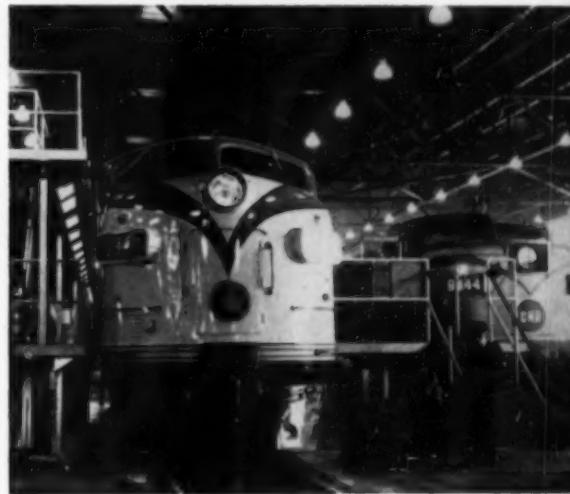
An idea of the power plant preferences of Canadian railroads may be obtained from this summary of the diesel-electric types in service at the first of October, 1958: 500 freight-passenger locomotives of 1500-1800 hp; 328 road switchers of 875-1200 hp; 1158 road switchers of 1500-2400 hp; and 700 switchers of 875-1200 hp. These diesels are responsible for 101,902,185 locomotive-miles of service performed in Canada during 1957, which is nearly double those accomplished by steam power—56,696,030 locomotive-miles. In freight service during 1957, diesel locomotives surpassed steam by nearly 21 million locomotive-miles; in passenger service by 7½ million. RDC's accounted for a total of nearly 4½ million train-miles during 1957, so all told there is no doubt as to the firm place diesel-electrics have earned for themselves in the pattern of Canadian railroading.

One of the most interesting facts concerning railroads north of the 49th Parallel is that they are still expanding. In 1959 new mileage will be created well to the north of the recognized population belt, for instance in the new Chibougamau mining area of central Quebec, and into new wilderness country of vast timber and mineral resources in northwestern Manitoba. For nearly half a century the P.G.E. creaked along its gorgeously spectacular mountain and ranchland route until suddenly a change of provincial government ownership gave it an astonishing transfusion. Today, the P.G.E.'s 788.6 track mileage begins in North Vancouver, and winds its way northeast into the heart of the Peace River country—to Fort St. John and Dawson Creek—an area fabulously wealthy in natural gas, ranching, timber, and

grain growing. Thirty-six diesel-electric locomotives of all types—all manufactured by the Montreal Locomotive Works—and 7 RDC cars provide the all-diesel power for the P.G.E. Its freight operation averages just under 2 million miles a month and passenger service, 140,000. The Pacific Great Eastern now ranks as Canada's third-largest railroad, and the country's first to employ a complete system of micro-wave communications between running units, ground stations, portions of the operating trains themselves, and section crews.

Despite the ills which beset railroads in these days of jet and turbo-prop aircraft, of massive highway trucks, and of low-cost water commerce, the railroads of Canada continue to fan out across the new north. As unit by unit old equipment is scrapped, the children of John Manlyuk and of all Canadians from coast-to-coast are coming to know the diesel-electric mainliner, the road switcher, the RDC, and all the family of sleek new thundering diesels, as the symbols of a new era in railroading in Canada.

Canadian National Railway's modern diesel locomotive maintenance shop in Montreal. From left: a 1750 hp GPA-17a; a 1600 hp MFA-16c by Montreal Locomotive Works and a 1500 hp GFA-15d.



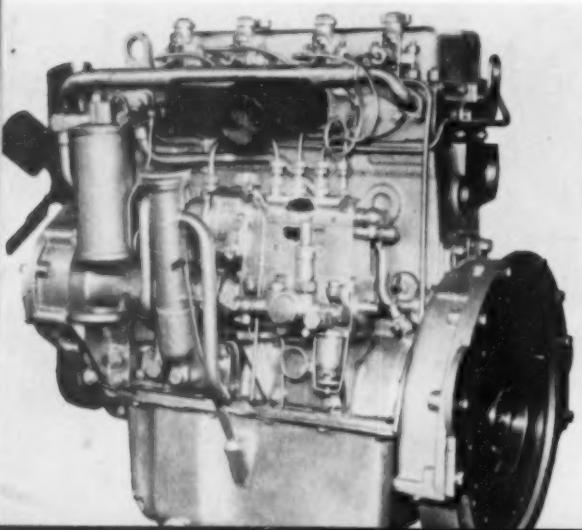
CPR 1800, Canada's first streamlined passenger diesel, manufactured by the Electro-Motive Division of General Motors at La Grange, Ill.—a 2250 hp E8—on its inaugural run. Author stands on the locomotive, rear row, third from left. Dec. 1949.

DIESELS FOR TAXICABS

By JIM BROWN

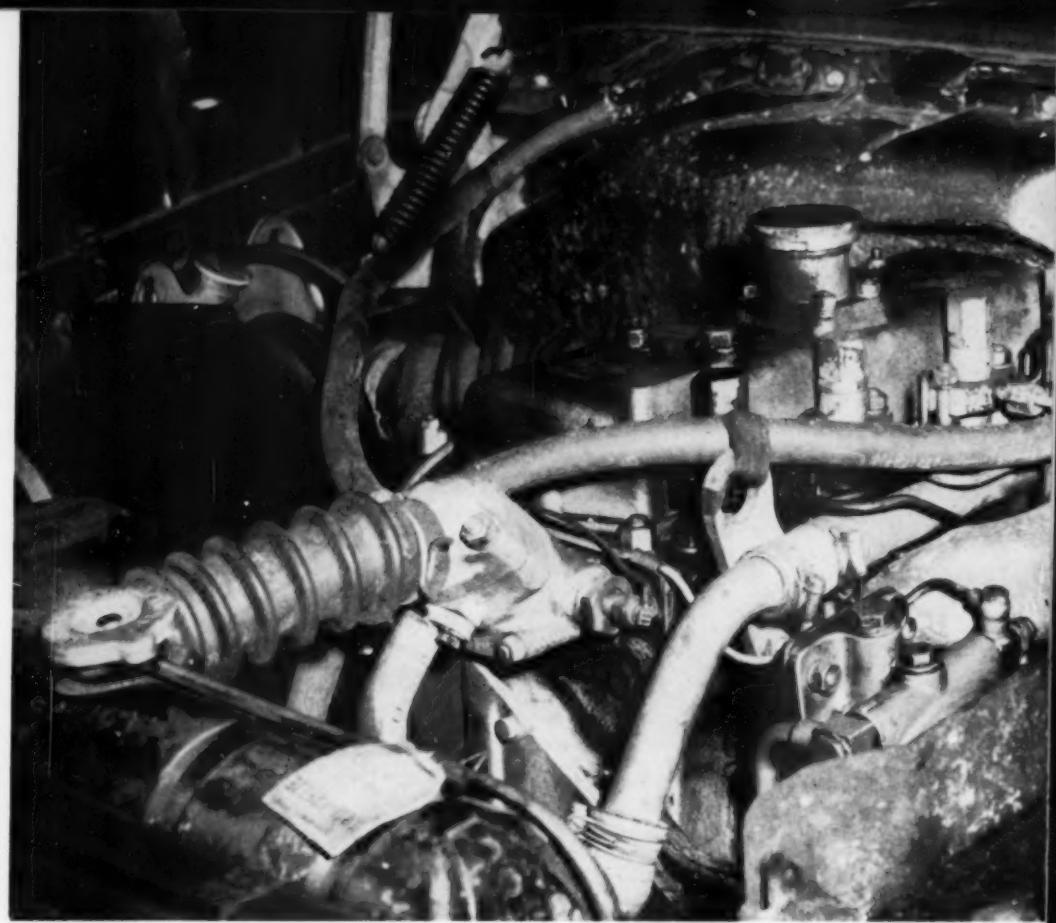
UNSUSPECTED by most of the inhabitants of the area and also by most of the passengers who have ridden in it, a new Detroit-built taxicab powered by a Perkins P4C 4-cylinder diesel engine is today running up mileage at a fast clip as a Checker cab in Detroit, Mich. The cab was converted from a new gasoline-powered Plymouth Savoy 4-door sedan taxicab by Ken Brown, a Plymouth dealer. The installation is being watched closely by American Diesel Corp. which furnishes the engines for such conversions and by quite a few taxicab owners who see in this development a promising solution to what has been a discouraging profit picture in the taxi business.

In Antwerp, Belgium there is a fleet of about 152 of these vehicles, many of which have individually run up as much as 130,000 miles without ever having cylinder heads removed, for the Antwerp Taxi Co.—a 100 per cent diesel operation. Diesel-engined taxis are commonplace in most European capitals, with a fleet of over 300 diesel taxis with Perkins P4 engines in Brussels as early as 1957, according to Autocar magazine. Certainly operating conditions (aside from differences in fuel costs) cannot be completely different in this country from those encountered in big European cities like London, Paris, Antwerp and Brussels. What has to be determined is not so much whether the Perkins P4C engine is well suited to the taxicab operation but how American taxicab owners, drivers and the public will react to the innovation. After visiting for a couple of days with David N. Viger, president of American Diesel and talking with Charles Ross, operator of a big chunk of the Checker Cab fleet, and with the drivers of cab No. 1360, the first such installation in Detroit, we're convinced the diesel taxi might be "here to stay."



The Perkins P4C automotive diesel, manufactured by F. Perkins Ltd. of Peterborough, England and furnished by American Diesel Corp. for installation in new Plymouth taxicabs at De-

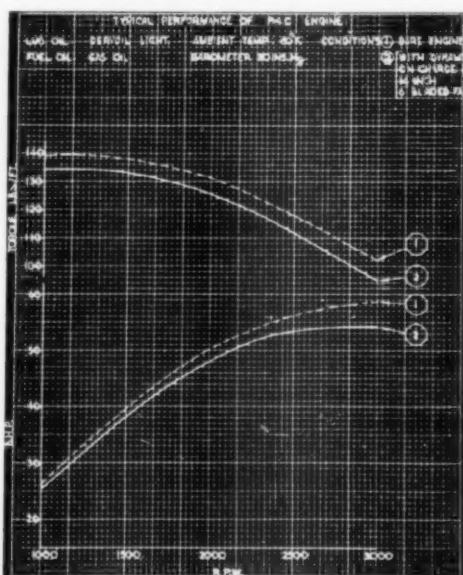
Performance curve of Perkins P4C engine. Curve No. 1 is bare engine; Curve No. 2 with generator and fan.



Unretouched photo of Perkins P4C engine in the Detroit Michigan Checker Cab No. 1360. After 12,000 miles usage, only repair which had been made was to replace a filter gasket.

no more noticeable than our non-hydraulic tappets used to be, and once you are rolling even this fades into insignificance.

This, of course, is not the first instance of dieselization of taxicabs in the U.S. One of the first U.S. installations was made by a Mr. Edelman, owner of the since-dissolved Fleetway Cab Co. in Baltimore, Md. Mr. Edelman, now retired, was impressed with the performance of Perkins diesels in European cabs while on a trip and had several shipped back to install in Plymouth taxis in Baltimore. These cabs ran up to 90,000 miles each for their original owner with a fuel performance of about 22.7 miles per gallon which is very good in taxi service. Perkins P4C engines are





Plymouth Taxicab are: heavy-duty chassis springs; heavy-duty shock absorbers; heavy-duty seat and seat-back springs; 70 amp-hr. heavy duty battery; 40 amp generator; 10 in. clutch; heavy-duty transmissions and heavy-duty (14 x 5½ in.) wheels. Actually the list of "extras" added to the standard Plymouths to fit them for the brutal punishment they may get as taxicabs is much longer; adds up to over 30 items differing from standard equipment. The 1959 Plymouth Savoy 4-door sedan taxicab, including all of the extras necessary for good performance in taxi service and with a Perkins P4C diesel installed by Ken Brown is priced at \$2,797 F.O.B. Detroit.

The difference in cost between the standard gasoline-engined Plymouth Taxi and the diesel conversion is \$795, according to Viger. However, it is not uncommon for a Detroit taxicab to be driven 50,000 miles a year. (The diesel Checker Cab in Detroit has gone 12,000 miles in three months). Because of a great deal of winter "idling" and other factors, a taxicab may do well to average 10 mpg on gasoline. Thus the yearly gasoline fuel

Harold McDowell, left, and Jim Russell, who alternate as drivers of the diesel taxicab expressed satisfaction with its performance.

money with a taxicab it has to be worked hard—as near to 24 hr. a day and 365 days a year as is possible. My own personal car of popular make failed completely to start on five different wet, foggy mornings this winter, even though well maintained. My mechanic says this is not at all unusual. When a taxicab fails to start it means more than just a personal inconvenience—it eats the heart out of the operator's profit.

The Perkins P4C engine supplied for taxicabs is a compact, 4-cylinder 4-stroke-cycle diesel with a 3½ in. bore and 5 in. stroke and a compression ratio of 16.5 to 1. It has a maximum governed speed of 3,000 rpm and produces a gross of 58 bhp at top speed. While its starting characteristics are said to be good, starting in extremely cold weather is facilitated by a diesel-fuel burning pre-heater located in the air intake manifold. Weight is given as 543 lbs., with electrical starting equipment but less flywheel and starter ring. Dry weights of the Plymouth gasoline taxicab engines without flywheel are approximately as follows: 6-cylinder, 463 lbs. and V-8, 598 lbs. The Plymouth

David N. Viger, president of American Diesel Corp., and Charlie Ross, who bought the first diesel cab for use in the Checker Cab fleet.



also being furnished to Ken Brown for installation in new Plymouth taxicabs destined for many other large American cities to serve orders now on the books but delayed by a strike at Chrysler's glass supplier. A good number have been ordered for use in San Francisco and Los Angeles, California; others for Seattle, Philadelphia, New York City, Boston, Baltimore and Washington, D.C. Cab companies in other cities have evidenced real interest.

The Plymouth Division of the Chrysler Corp. has long specialized in taxicab manufacture and it's believed that more Plymouth taxis are in use than any other make. Some of the main features of the

cost per cab, at 24.9¢ (current local bulk cost) could be approximately \$1250. If you could double your mileage with diesel, as Viger confidently predicts, you would be using only 2500 gal. of fuel oil priced at approximately 22.7¢ per gal. here, or \$567.50 worth of fuel oil in a year. On this basis the savings in fuel alone would be \$782.50 in the first year which would amortize the extra cost of the engine. In some spots, such as New York City, a taxicab may be driven from 80,000 to 100,000 miles a year with consequently higher fuel savings possible through dieselization. Other big areas of savings through dieselization lie in reduced maintenance and less downtime. To make

taxicab has heavy-duty torsion bars and heavy-duty shock absorbers. Gear ratios in the dieselize cab are the same as used in the gasoline-engined cabs: 2.5:1, 1.68:1 and 1:1 with a final (axle) reduction of 3.75:3.

Mr. Viger of American Diesel said, "We are 100 per cent confident of the future of diesels in American taxicabs. It is as sure to come as was the dieselization of the railroads. However, since conditions of taxicab usage vary so greatly in different cities, we are going to go slow on predictions as to how well or how soon we can meet this very evident need."



MISSISSIPPI-GULF'S 77 MILE CHANNEL

**Powered by 3700 HP Cooper-Bessemer Diesel.
Pipeline Dredge *Paul F. Jahncke* Is Removing 300
Million Yards of Material to Make It**

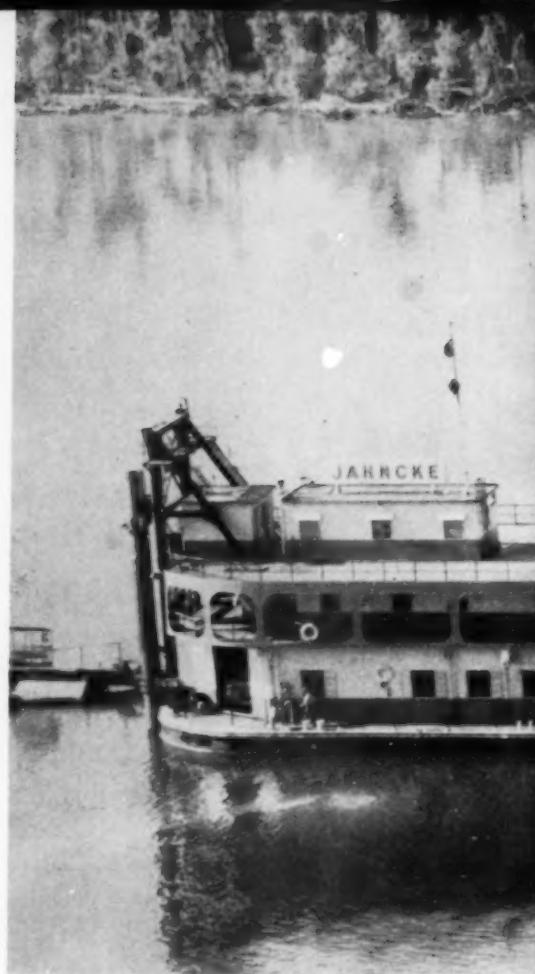
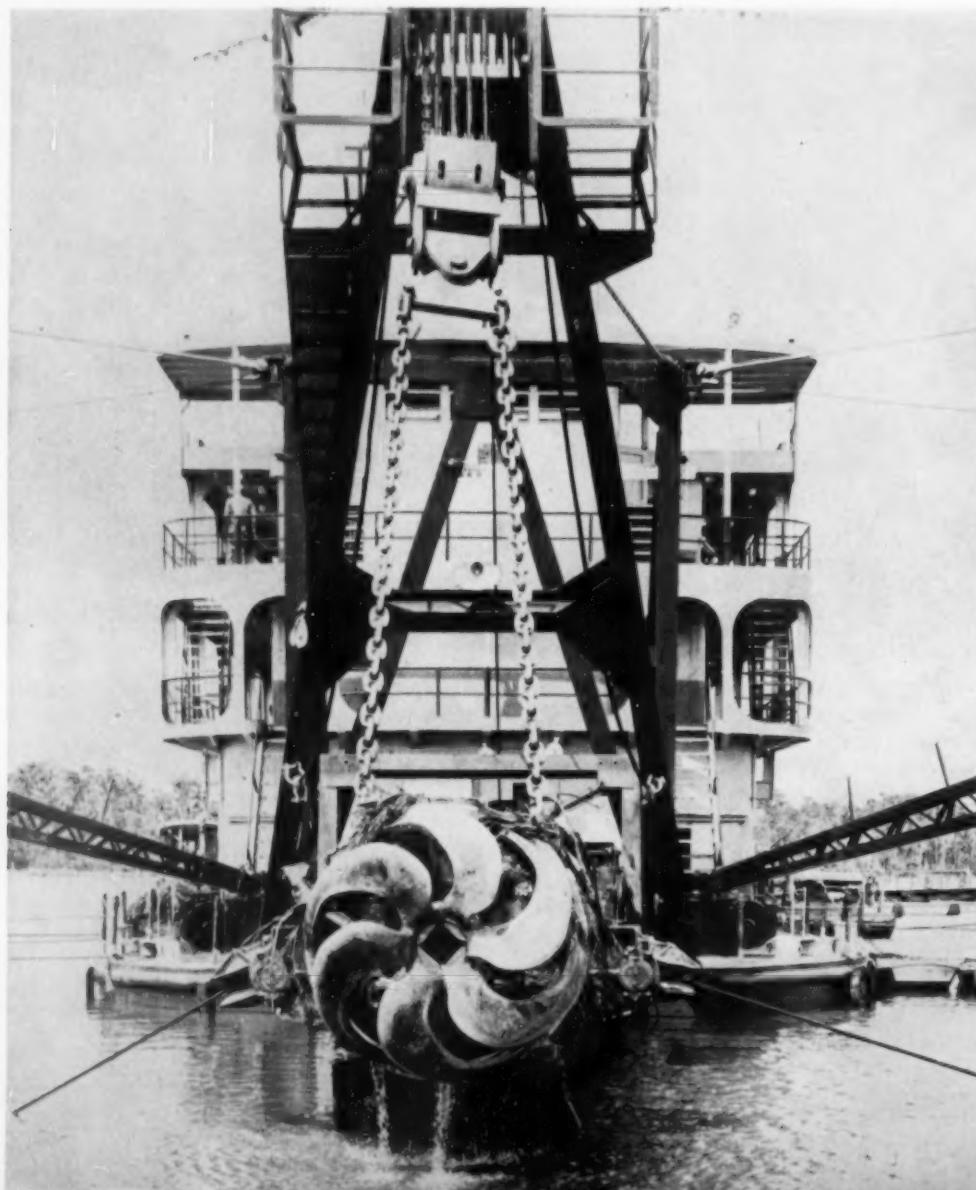
IN the last century, man has done more in his progress to build or modify water traffic routes than ever before in history. This he has done at a greatly accelerated pace, thanks to ingenious power machinery to utilize more fully the possibilities of water traffic ways. Along with this, men everywhere have been harnessing also water power possibilities by controlling water flow or ultimately confining flows entirely to prevent flood disasters. To this end are never ending changes witnessed in essentially every major traffic artery of the world—the Suez Canal, the Panama Canal, the newest St. Lawrence Seaway, the flood control systems along the Mississippi River system.

The very latest in the ever changing waterway panorama is the more recent Mississippi River-

Gulf Outlet project now under construction by the U. S. Army Corps of Engineers of the New Orleans District. The Mississippi River-Gulf Outlet project provides for the construction and maintenance of a 77 mile channel from the Gulf of Mexico to New Orleans. Before it is completed, over 300 million cu. yds. of material will be dredged, forming a channel 36 ft. deep, 500 ft. wide. When opened to river traffic, this newest man-made waterway will provide an alternate ship route to the Port of New Orleans, thus providing for orderly expansion of this waterfront.

The new water route made possible by the Mississippi River-Gulf Outlet project will enable vessels to save 40 miles of travel from the open Gulf waters to New Orleans. In addition to the saving in

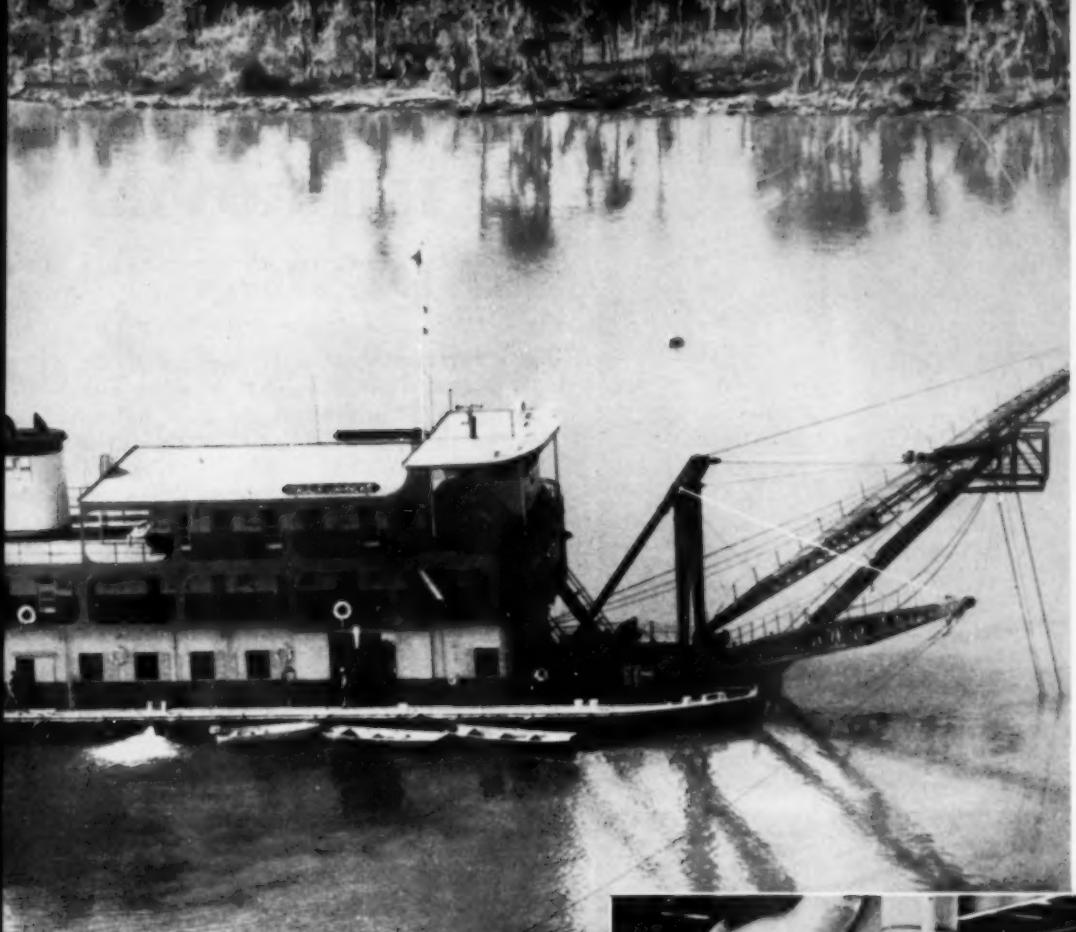
80 in. dia. impeller driven at speeds of 250 to 360 rpm by direct coupled Cooper-Bessemer diesel to dig at depths ranging from 10 to 75 ft.



distance will be savings in time by enabling vessels to make a more rapid passage in a nearly straight channel. The new channel Army Engineers predict will not be plagued by silting or shoaling from suspended matter washed down from upper reaches of the river. Nor will the channel be subject to large variations in water level. For the booming Port of New Orleans, the channel creates elbow room for new wharves. Industrial expansion will be further encouraged by relieving the growing congestion of existing harbor facilities. In such major projects, powerful dredges have been found through recent years to be a most useful and efficient tool. Through their very size, they can handle the removal of vast amounts of materials from river bottoms as encountered in the construction of a ship canal. The size and the performance of such dredges have continued to grow, improving in effectiveness with each major project. This realization is borne out in dredging operations now underway. It is evidenced in the first two contracts of the newest project awarded to Jahncke Service, Inc., prominent New Orleans dredging and marine contracting firm.

Handling this dredging operation is perhaps the most modern of all large dredges in the Gulf Coast area. It is a 24 in. hydraulic pipeline unit, the *Paul F. Jahncke*, named for the Corporation's Board Chairman. Constructed by its owners, Jahncke Service, at their Madisonville yard, the new dredge *Paul F. Jahncke* was designed by the Ellicott Machine Corp. of Baltimore, Md. The dimensions of the hull are 170 ft. length, 40 ft. width, 12 ft. depth.

Powering an Ellicott heavy-duty dredge pump that forms the heart of the dredge is a Cooper-Bessemer LSV-12 turbocharged diesel engine, capable



The *Paul F. Jahncke*, at work digging a 36 ft. channel 500 ft. wide on the 77 mile channel from Gulf of Mexico to New Orleans.

3700 hp Cooper-Bessemer turbocharged diesel type LSV-12 cylinders in the *Paul F. Jahncke*. With Woodward UG governor control, engine delivers full load torque over entire speed range.

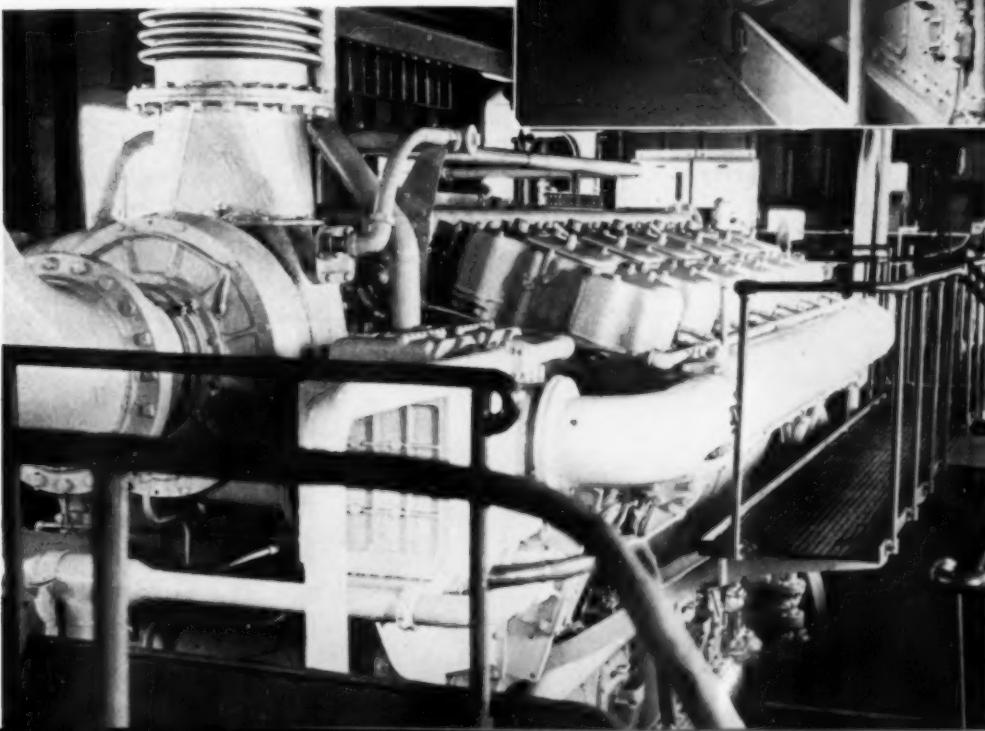
Turbocharger end of Cooper-Bessemer engine shows Young intercooler.



of delivering 3700 hp at 960 rpm crankshaft speed. With its inherent slow crankshaft speed, the Cooper-Bessemer engine is directly coupled to and turns the 80 in. diameter dredge pump impeller at speeds between 250 and 360 rpm. Through governor control, the engine delivers full load torque over the entire speed range, thus assuring maximum performance under all dredging conditions. Quiet and reliable in operation, the Cooper-Bessemer LSV-12-T engine is proving an effective factor in the continuous, uninterrupted performance of this dredge. Working around the clock, the dredge *Paul F. Jahncke* is removing material from the new canal bottom at the rate of 50,000 to 55,000 cu. yds. of material per day.

Power for auxiliary machinery comes from two 900 hp General Motors, model 12-567, diesel engines. Each engine drives a tandem arrangement of an ac generator and two dc generators and excitors to provide the maximum flexibility of operation under any condition of load requirement. The arrangement also provides continuity of operation in the event of failure of an individual unit.

For an ultimate in efficiency, the *Paul F. Jahncke* incorporates the latest in dredge design embodying finger tip control and operation of all of the dredging operations by a single man in the lever room.



This man has direct communication with all parts of the dredge as well as radio contact with various boats of the fleet and shore offices. The electrical control system aboard the dredge is also one of the latest and improved designs for quick, easy operation and simple maintenance. The dredging ladder, for example, incorporates a quick-removal section, enabling the dredge to dig efficiently at depths ranging from 10 to 75 ft. maximum.

Work on the new water route is progressing as scheduled so that in the not too distant future, ships from the Port of New Orleans will be using the new seaway outlets to make their shorter and more rapid trips to the Gulf and thence to ports in all parts of the world.

100 FOOT TUG OF IMPROVED DESIGN

WITH more than three-quarters of the earth's surface covered by water, man throughout his entire history has sought to traverse the oceans, the seas, the lakes and the rivers in the safest, fastest and most economical way. To achieve these objectives, man in every land and every century built craft to suit his immediate needs. When he learned he was able to build and propel his craft, he broadened his horizons and his ability to trade with other peoples and nations. His potential for growth and expansion of trade was limited by the ability of his ships to ply the waters of the earth. With the opening of "new" lands for trade, the need for larger ships became a necessity. Traders were limited by cargoes they carried and the cargoes were limited only by the size of the vessels. Skilled men applied their talents toward designing ships which would meet the need of the seafaring traders. These men were the forerunners of today's naval architects.

Steady progress was made in the design of the vessel and simultaneously progress was being made in the propulsion of ships—at first the oar or paddle, then the ship was driven by wind in the sail and finally the internal combustion engine and steam provided the power. As ships were made larger, it became necessary to have small and powerful vessels to berth these large ships at their ports. This was the specific job of the tug. However, with the development, acceptance and wide spread use of diesel propulsion machinery in tugs, the tug also became a vessel for long hauls of barges on the open sea and throughout the inland waterway systems. Recognizing the importance of the tug boat in the harbors and rivers of the Western Hemisphere, and the relationship of the hull design with the propulsion machinery, the Cleveland Diesel Engine Division of General Motors set up a Marine Design Department. This department not only offers tug designs to operators, but another important function of this staff is to advise and consult with the operators and their naval architects to insure that both the design of the hull and the propulsion machinery are "matched" to meet the operators' specific needs.

The experience gained over many years in the powering and supervising the building of tugs was incorporated into the design of an improved gen-

Top—*Nancy Moran*, 100 ft. tug owned and operated by Moran Towing Co., is the first of the series built to improved design.

Center—Top profile of the *Dalzell Eagle*.

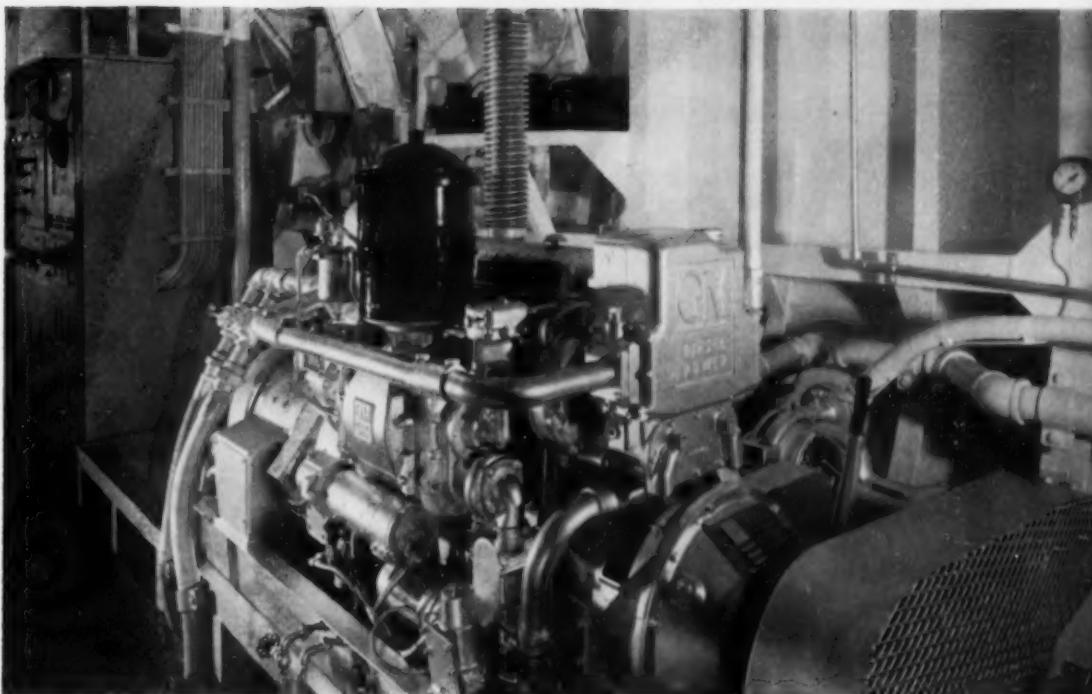
Bottom—Engine room showing 1200 hp GM Cleveland Diesel, Wichita slipping clutch, Falk 4:1 reduction gear and Air-Maze air filters. Briggs oil filters and Marquette governors are also used.

eral purpose vessel. The new 100 ft. tug incorporates all the features necessary for a tug to efficiently work both in confined harbor areas and on extended sea duty. The first of this series of 100 ft. tugs built according to the improved design is the *Nancy Moran*, owned and operated by the Moran Towing and Transportation Co., Inc. The *Nancy Moran* went into service in mid-October 1958. After several months of continuous service, Admiral Edmond J. Moran said: "We have found that the new tug with her 1600 shp diesel engine is able to fulfill her assigned role in the docking of larger ships like the *United States* and the *Queen Elizabeth* with greater ease and in less time. The *Nancy Moran* works "head on" to the ship and uses its full power. Late in December 1958, a second tug of like design and horsepower, the *Dalzell Eagle*, owned and operated by the Dalzell Towing Co., Inc., went into service in New York. Like the *Nancy Moran*, the *Dalzell Eagle* is meeting all the requirements of her owners.

Many features were incorporated into the design of this tug which makes it a more flexible vessel for docking operation as well as general towing. The tug has 1600 shp for 100 ft. of length which is a higher power ratio than usual for this type vessel. With the appreciable increase in horsepower, it was necessary to build a vessel of much stronger construction. Additional strength was designed into the tug by:

1. A substantial increase in the size of the stern frame casting.
2. Every third frame in the engine room is a deep web frame.
3. A main longitudinal deep stringer has been added to each side.
4. Strengthening the engine foundation.

There are four double staterooms on the main deck and one double stateroom on the boat deck. Because of this arrangement, it was not necessary to develop living quarters in the forecastle. However, bulkheading and tank tops have been arranged so that quarters can be made in the forecastle if the tug is required for extended sea duty. All quarters have been made accessible by inside passageways, including pilot house and boat deck quarters. Longitudinal backing bars are built in



Detroit Diesel 3-71 engine drives 30 kw Delco generator for auxiliary power.

all guard rails and bulwark has been set inboard as well as quarter bitts raking inboard for additional protection against damage. While the *Nancy Moran* and the *Dalzell Eagle* are identical in size, machinery and accommodations, it should be noted that they differ in outward appearance.

Specifications of the General Purpose 100 ft. Tug

Dimensions:

Length overall	99'5"
Length A.B.S.	95'0"
Beam	25'10"
Depth Midship	13'7 1/2"
Designed Draft	12'0"
Gross Tonnage	228.47
Net Tonnage	155.00

Propulsion Machinery:

General Motors model 567C, 1600 shp diesel engine through a Wichita controlled slip clutch

and a 4:1 reduction gear.

Auxiliary Machinery:

One model 3-71 General Motors diesel 30 kw Delco generator unit and one 25 kw main engine-driven generator unit.

Capacities:

Fuel capacity	29,000 gals.
Fresh water capacity	2,400 gals.
Speed light	12.00 knots
Shaft power	1600

Propeller:

9'6" diameter, five-bladed

Crash Stop:

Full ahead to dead in water 30 sec.

Full astern to dead in water 12 sec.

Rudder:

Hardover to hardover (100°) at full speed 11 sec.

Recorded Normal Bollard Pull:

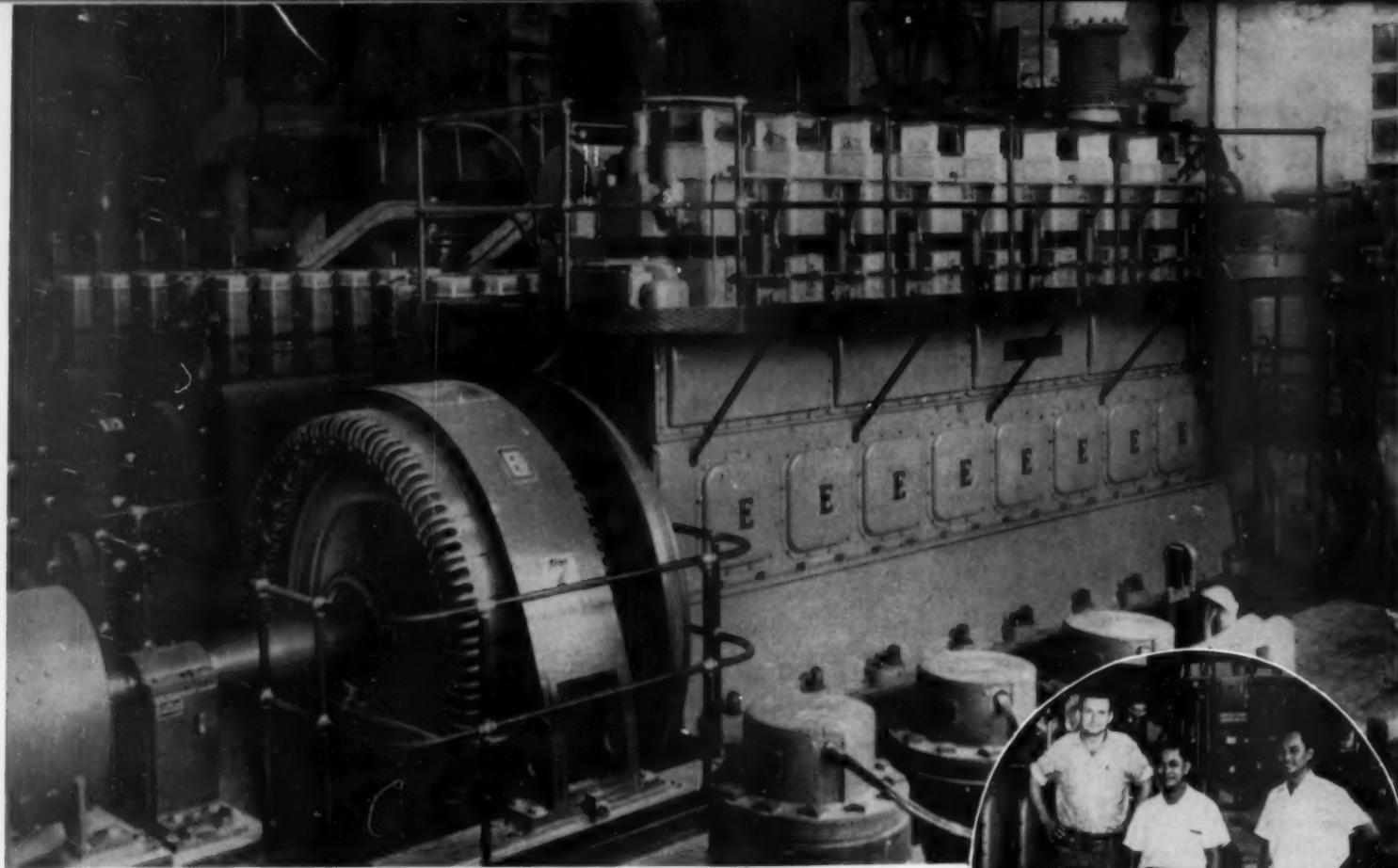
46,630 lbs.

Maximum Bollard Pull:

51,400 lbs.

Dalzell Eagle with New York skyline in background. Vessel has a speed light of 12 knots.





POWER INCREASED AT PHILIPPINE CEMENT MILL

WHEN a person thinks about industry in the South Pacific they normally associate copra, coconut oil, and such. The Philippines bring to mind Manila hemp. However, displaced though they may seem to most mainlanders, cement plants are thriving in the Philippine Islands and have been for over half a century. Located thirty-five kilometers from Manila in the town of Binangonan, Rizal is Rizal Cement Co., Inc., one of the diverse interests of Madrigal & Co., Inc., which, among other things, includes: ships, real estate, and Jai Alai, the major sport of the Islands. While it isn't the largest, Rizal is probably the oldest of the three major cement plants in the Philippines. Founded in 1904, the firm has been a part of much of the history of the Philippines. It was incorporated with a subscribed and paid up capital of one and one-half million Philippine pesos in 1912. The factory at its present site in Binangonan was installed by German engineers in 1914 and started operation in 1915 with a rated capacity of 500 barrels or 2,000 bags a day.

The first and major dark period in the history of Rizal started in 1916. As a result of frequent ring formation in the kiln and lack of labor during certain periods, the factory had an average operating period of only 460 hours per month for the first five months of 1916. Running into financial troubles, Ynchausti & Co. was named liquidator. With the entry of the United States into the first World War, the German technicians were placed in a concentration camp and the factory ceased operation. The court, in 1925, ordered the assets of the corporation sold at public auction; Ynchausti

with a bid of 75,000 pesos was the only bidder.

Madrigal & Company started negotiations for the purchase of all assets and properties of the Rizal factory at Binangonan, including the Rizal trade mark, for a price of two and one-half million pesos. Formal transfer of ownership took place in 1928. Almost immediately a modernization and expansion program was put into operation. Due to considerable difficulty in the production of the high quality cement desired by management, the plant was converted from the dry to the wet process in 1929. Capacity was increased by the installation of a 1,200 barrel rotary kiln. Production facilities were further improved by the purchase and installation of a 2,000 barrel cement grinding mill with control drive in 1939. Plans for a 2,500 barrel per day capacity failed to materialize because of World War II, the second and last dark period in the history of Rizal. In the latter part of 1943, under Japanese rule, Madrigal was forced to sell one third of its interest to Mitsui Bussan Kaisha, and another one third to Oneda Cement Co. A new corporation was formed as the Federated Investment Co. capitalized at 5,000,000 pesos under the management of Onoda. Japanese occupational forces kept the plant in operation with Rizal personnel. This was fortunate because the plant suffered little damage when the Japanese retreated. After liberation in early 1945, the U.S. Alien Property Custodian took hold of the property and operated the plant under MANED (U.S. Army) management until the surrender of the Japanese. In 1947 the Alien Property Custodian gave the management to Madrigal under the name Fed-



erated Investment Co. Thus, once again under Madrigal ownership, Rizal was playing an important role in the reconstruction of Manila and nation building of the Philippines.

As might be expected, to prove profitable a cement plant must be in continuous operation and dependable power is of the utmost importance in ensuring continuous operation. Through most of the years of its existence, Rizal's own power plant has provided this dependable power. Initially power was supplied by two 500 hp Wolf Locomobile steam engines mounted on top of boilers. With expanded production facilities requiring more power than the plant could provide, between 1930 and 1934 power was purchased from the Manila Electric Co. Recognizing the economy of their own diesel plant, during 1934 the first diesel, an 800 kw M.A.N., was installed, followed by a second 800 kw unit in 1938.

With ever increasing post-war demands for cement, plans were prepared to increase the plant's capacity to 3,000 barrels. To meet the increased power requirements, an Enterprise DSC-38, 1000 kw turbocharged diesel generator unit was placed in operation in 1953. In 1955 three Enterprise DSG-6's, 325 kw each, were moved from Madrigal's Jai Alai Palace power plant in Manila to the cement plant. Originally intended for use as standby power units, further expansion necessitated their full time operation. The load being placed on the power plant was again reaching the limit of the plant's capacity by 1957. At first consideration was given to the utilization of purchased power. However, an analysis of their own low maintenance cost coupled with the economy possible on a pro-

Enterprise diesel rated 1769 hp at 360 rpm, with Elliott 1250 kw generator. By burning heavy fuel, generating cost is less than one and one-half cent per kw hour. In the background are the three Enterprise DSG-6's and the other DSQ-38.

From left, Bill Brown, Enterprise erection and service engineer; Francisco Cortes, resident mechanical engineer for Rizal; and Romy Sison of Standard Vacuum.

Rizal Cement Co., Inc. plant at Binangonan, Rizal, Philippine Islands.



Quarry rock is hauled to the plant in buckets slung from this cable tramway built by German engineers in 1914. The quarry is located six kilometers from the plant.

posed operation on residual fuel in comparison with the cost of purchased power dictated the continued operation of their own plant. Early in 1958 another Enterprise DSQ-38, 1250 kw, diesel was installed along with fuel treatment equipment converting the other Enterprise diesels to selective fuel operation. Single selector valves on the engines permit selection of fuel, either diesel or bunker type (residual).

Purification of the fuel is accomplished by De Laval self-cleaning centrifuges. Operating for long periods of time and handling hundreds of thousands of gallons of bunker fuel without the need of shut down and disassembly of the bowl for cleaning, the centrifuges fulfill the plant requirement of full capacity at all times. Fitted with manual controls, the accumulated solids are shot from the bowl two or three times per eight hour shift. By converting the diesels to burn bunker fuel a savings of five cents a gallon on fuel was realized. Generating cost for the Rizal Cement plant as a whole is less than one and one-half cent per kw hour and is the envy of the other two plants running on heavy fuel in the Philippines. It is the first commercial plant utilizing heavy fuel in the Islands, the other two plants being the U.S. Government Voice of America and U. S. Navy Subic Bay Naval Base installations.

An operator takes a reading from the De Laval self cleaning centrifuges used for clarification and purification of the bunker fuel. Chromalox primary heaters for the heavy fuel are to the right.

Much of the credit for the low maintenance cost may be given to Professor Domingo S. Mendoza, consulting mechanical engineer and purchasing agent for Rizal. Operators for the plant are selected from graduating mechanical engineers from the various technological colleges in Manila, many of whom have been taught by Professor Mendoza. Under the supervision of Mr. Magtangol Espiritu, Power Plant Superintendent, and Mr. Francisco Cortes, Resident Mechanical Engineer, the well trained personnel are combined with high standards of maintenance and cleanliness and reliable equipment to keep all engines running twenty-four hours a day. With full capacity needed at all times there just isn't any time for engine overhaul. Such standards are not easily accomplished in a power generating plant for a cement plant. Cement dust constantly saturates the air. It forms into a concrete shell if in contact with moisture and left to dry. "Dusting" the equipment along with regular maintenance practices is apparently routine with the operators at Rizal. For example, the Enterprise DSQ-38 installed in 1952 has run steadily since that time using the same rings and never has been overhauled. W. (Bill) W. Brown, Service Engineer for Enterprise, reported that it was one of the cleanest engines he had ever seen.

Installation of new production facilities since the end of the war have brought the capacity of the plant up to 20,000 bags per day. With the rolling limestone hills of San Guillermo expecting to yield limestone for many more years and the continued aggressive economic development of the Philippine Islands, there is virtually no limit to the further expansion of Rizal.

List of Principal Equipment

Engine	Enterprise
Generator	Elliott
Exciter	Elliott
Turbocharger	Elliott
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ORE RUN FROM EAGLE MOUNTAIN

By DOUGLAS SHEARING

IUT in the Eagle Mountains in the Southern California desert, Kaiser Steel Corp. is mining millions of tons of ore to feed its hungry blast furnaces in Fontana, 164 miles away. Moving the ore from pit to mill is a tough job, yet it is being handled with great dispatch by a dependable crew of diesized equipment—modern dump trucks, among the largest rear dump semi's ever built and a fleet of diesel-electric locomotives that at times sees 14 units pulling in unison.

The Eagle Mountain site is truly a senior sized mine and is located some 200 miles east of Los Angeles. Here, in less than a decade, Kaiser has expanded from a small open-pit operation to one of impressive size. It now can supply $3\frac{1}{4}$ million tons of beneficiated iron ore to the Fontana steel mill. Here Kaiser operates four blast furnaces, the only furnaces on the Pacific Coast, and the hot metal they produce is refined into steel which serves industry at large in the west. To date, three bodies of ore in two pits have been developed at Eagle Mountain. One, the Bald Eagle has been mined to planned depth, producing 4,600,000 tons. The other pit, the North-South, was started in 1952 and it is now being worked. Benches 45

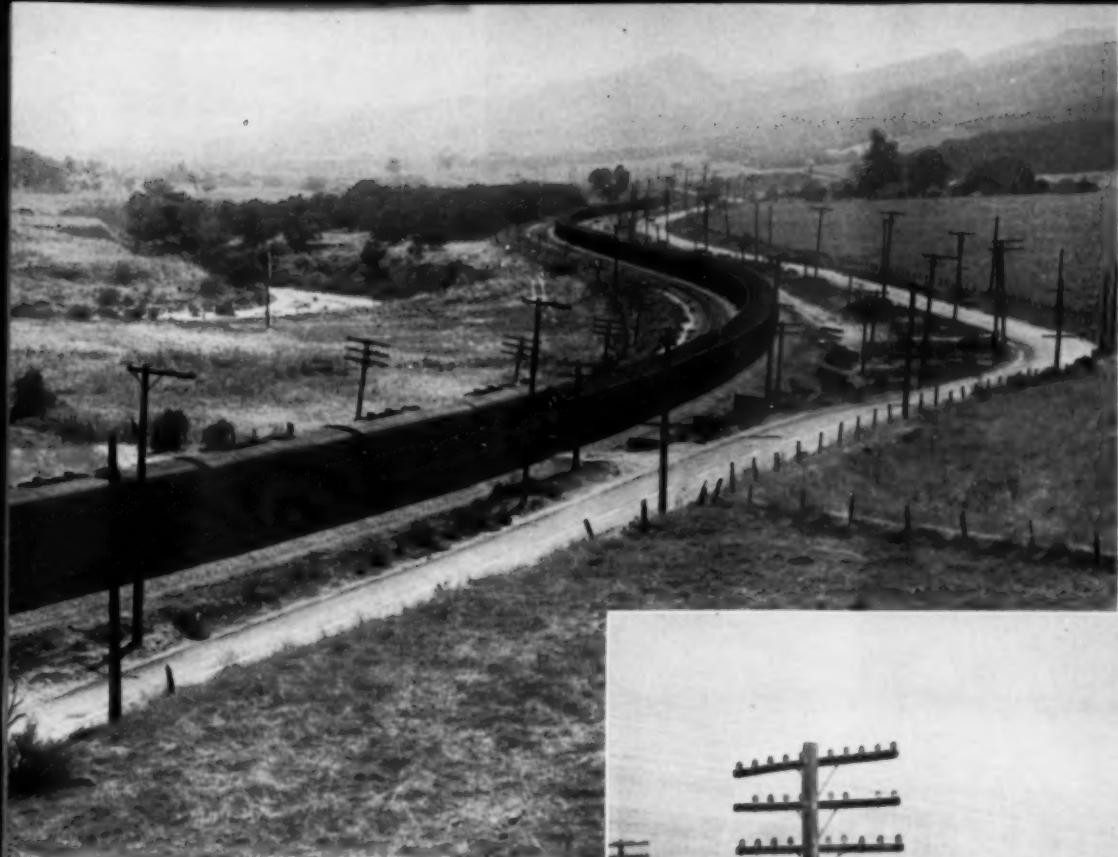
ft. high are currently being used and they provide for mining and stripping of orebodies at the apex at Elevation 1760, to the bottom of the pit at Elevation 700. Truck haul roads are 70 ft. wide and are built on a $7\frac{1}{2}$ degree grade. Following drilling and removal of waste, shovels ranging from $4\frac{1}{2}$ to 8 cu. yds. move in for loading. Working under these shovels is a fleet of 27 Kenworth diesel trucks ranging in capacity from 22 to 64 tons which are assigned the job of moving the ore from the pit to the primary crusher. The 64 ton units are Ken-



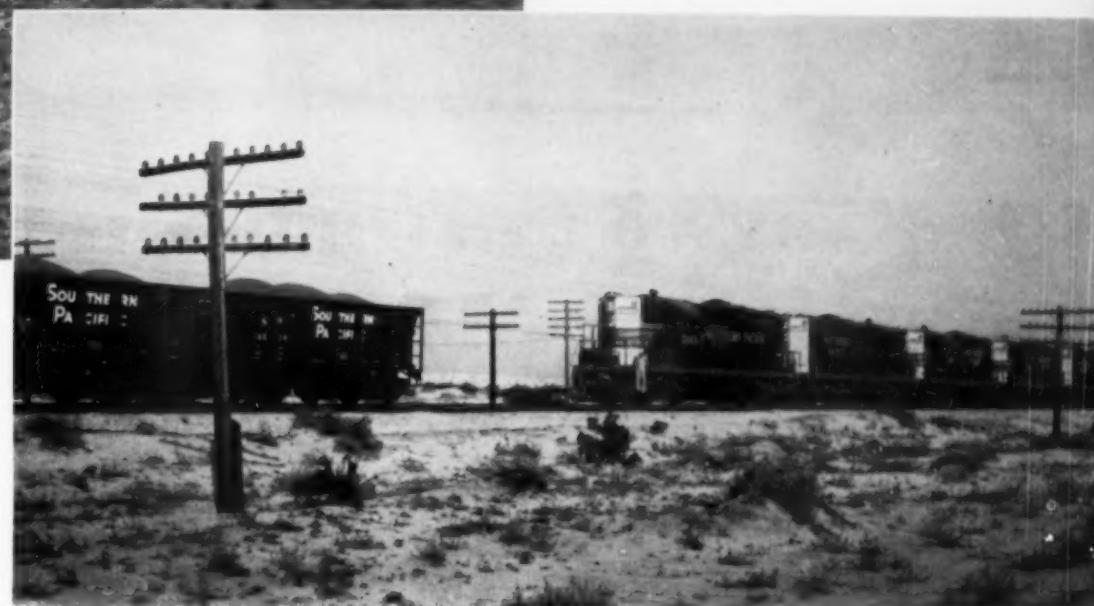
↑ The five Kaiser Steel diesel units are Baldwin AS 6-6-1600 units weighing 150 tons each.

← The barren mountains of the Southern California desert provide the backdrop for one of the Cummins V-12 powered Kenworth dump trucks in operation at Kaiser Steel's Eagle Mountain mine. The truck is discharging its load of around 64 tons ore into the mine's crushing and beneficiating plant.

worth model 803-B powered by the Cummins V-12 turbocharged, 12 cylinder, 400 hp engines. The rear dump semi's measure nearly 42 ft. from front bumper to the rear of the trailer and have a gross vehicle rating of 228,000 lbs. or 114 tons. They are the first of this model produced at Kenworth's Seattle plant. Too large to travel on ordinary highways, the trucks were shipped by rail in three sections to Eagle Mountain for assembly. Because of their rugged service, the haulers are subjected to a rigidly controlled preventive maintenance schedule. Typical of this servicing program is a drive-through lubrication rack where all trucks are



Five lead Southern Pacific EMD GP-9 diesels as they descend a grade between San Gorgonio pass and Fontana pulling a long string of ore cars that stretches as far as the eye can see.



Five Southern Pacific diesels being cut into the string of ore cars in preparation for the push up the San Gorgonio pass grade.

processed according to the manufacturers instructions. The lubricating system was supplied by Alemite who also furnished the systems for the mobile service trucks. Lubricants and greases are produced by several oil companies to Kaiser's specifications.

After the ore has been beneficiated it is moved by train to the company's Fontana mill. For this purpose, Kaiser recently placed in service 600 of the most modern ore cars in the country, each capable of carrying nearly 100 tons. The cars used heretofore could only load approximately 65 tons. Considering that the total weight of each new car and its cargo comes to 125 tons, the equivalent of 80 average passenger automobiles, the job of moving from 80 to 100 of these cars 164 miles, (40 miles upgrade) to Fontana is a substantial task—one however that is daily being met by the efficient use of diesel locomotives. Evidence of this is a recently completed test run in which Kaiser coupled 100 of the new cars and hauled 10,000 tons of ore to Fontana. Railroad officials termed this the heaviest load ever pulled over the Beaumont Pass in Southern California. The initial mileage was made over Kaiser Steel's own tracks with the ore train pulled by the company's five AS type 1600 hp Baldwin diesel locomotives—a trip of around 52 miles from the mine to a junction point on the main line of the Southern Pacific at Ferrum, Calif. This first stage is mainly downhill going from 1400 ft. at the mine to 190 ft. below sea level at Ferrum near the Salton Sea. At Ferrum the 100 car train was taken over by five General Motors EMD GP-9's rated 1750 hp each. These SP diesels pulled the train about 35 miles to a point part way up the Beaumont Pass grade where nine more EMD's

were cut into the string of cars, several about 20 cars back of the lead diesels and the others behind the caboose. After reaching the summit at Beaumont, which meant rising 2397 ft. in 40 miles, the helper locomotives were cut out with initial five units pulling the ore train 34 miles into the Fontana mill yards.

This, of course, was a test run and the number of cars per train hauled daily is determined by the ore demand from Fontana. With the fourth furnace already in operation the mill's consump-

tion has increased. At the present time, the ore demand averages around 7,000 tons per day, five days a week, which is carried in the trains of about 72 cars each. Since the run from Eagle Mountain to the SP's line at Ferrum is 52 miles, a single train can usually be made up at the mine and complete a round trip run within an 8 hour shift. With four blast furnaces in operation, two trains per day are used. Working hand in hand with Kaiser, Southern Pacific is continuing their experimental work to determine the most efficient combination of diesel units and ore cars.



Newly developed ore car, designed to carry nearly 100 tons of iron ore, is shown here as it is pulled into a rotary dumper at Kaiser Steel's Fontana, California, steel mill. The cars were built by the Southern Pacific Railroad.



The two assembly line sheds for the 67 ft. trawlers plus the 1500 ft. outfitting dock. In the center is the machine shop and stock room. Another assembly line shed can be seen in the background.

George Codrington, former vice president of Cleveland Diesel Div. of General Motors Corp., who founded Diesel Engine Sales Co. and L. C. Ringhaver the present president and general manager of Diesel Engine Sales Co. are shown in front of Codrington's yacht the *Seaplay*.



DESCO OF FLORIDA

Diesel Engine Sales, Inc. of Florida Builds First Trawler with General Motors 8V-71 Engine. Company's 800th Vessel Also Enters Service

By ED DENNIS

In the shores of the San Sebastian River, against a back drop of live oak trees, in the City of St. Augustine, Fla., is the busiest of Florida's small ship yards—small, only in the sense that the yard only turns out vessels up to 100 ft.—busiest, because it has built more shrimp trawlers than any other ship yard on the face of the earth. The original yard was opened in 1943 and during World War II did repair and conversion work for the Coast Guard. Then in 1947 it was acquired by George Codrington, then vice president of the Cleveland Diesel Engine Div. of General Motors Corp., and some other business associates. Shortly thereafter Codrington brought L. C. Ringhaver, a cost accountant with the Cleveland firm, to St. Augustine to manage the newly acquired ship yard. Although Ringhaver did not possess much knowledge about shipyards, he did bring to the firm a vast wealth of knowledge in company management, cost accounting, production control and tremendous energy, vision and a capacity for hard work, all the characteristics of the success that was to establish Diesel Engine Sales, Inc. as the major fishing trawler builder in the world.

The firm, in 1947, was turning out about two trawlers a month. Instituting a purchasing control system and the mass production method, this was soon stepped up to three and four a month

to make the production schedule even greater. Mr. Ringhaver embarked on an expansion program which has steadily grown as the years rolled on to a point where their production schedule calls for close to 10 trawlers a month. Besides being the first shipyard to turn trawlers out on a production line method, the firm has a long list of other *firsts*. One of which was the designing and development of a steel engine frame which kept the engine in alignment without need for periodic shore hauling adjustment as it was with the old wooden engine base. Another first that DESCO chalked up was the launching of the shrimp trawler *Cumberland* in July 1958 which was the first of its kind to have a General Motors 8-V-71 diesel engine.

More and more the trend is to build larger and sturdier trawlers able to sail and shrimp anywhere. This has led to several changes in the trawler building industry, one being the use of diesel engines with more horsepower. With this in mind it was decided to install a General Motors V8 diesel in a regular production line trawler as an experiment. It was the first installation of its kind in the Gulf trade and it has proven very successful.

The *Cumberland*, owned by Alvin C. Dickey of St. Mary's, Ga., is typical of the standard DESCO

67 footers except for its GM 8-V-71 marine diesel. Designed by Tams Inc., it has an 18½ ft. beam and a 6½ ft. draft and can readily boast of speed and seaworthiness necessary to work in today's far flung shrimp beds. In the *Cumberland*, the compact General Motors V8 engine is demonstrating the part the propulsion machinery can and is playing in realizing high horsepower output efficiency. Despite its high horsepower rating the newly designed diesel is light in weight (approximately 3130 pounds) and takes up considerably less space which permits the trawler to haul a greater payload. The engine has a rated shp of 308 at 2300 rpm or a cont. hp rating of 227 at 1800 rpm. This 8 cylinder two cycle diesel has a 4½ in bore and a 5 in. stroke. Power is delivered to a 52x40 four bladed Federal propeller through a General Motors Allison 4.5:1 hydraulic reverse and reduction gear which gives the craft a speed of 14 knots. A power take-off is used to operate such auxiliary equipment as the drum hoist, etc. Other engine

room specifications are a keel cooler for the engine, Hilco secondary lubricating oil filters, a Perry water filter, CFC Fullo fuel oil strainer and the four fuel oil tanks with a capacity of 5000 gals.

Construction specifications on this standard 67 ft. trawler show the use of a 9x12 fir keel, an oak bowstem, 10x10 Sampson post and 2 in. pine decking with the deck beams being of 4x4 pine on 12 in. centers. All planking is of 1½ in. select cypress and fir. The cypress pilot house measures 20½ ft. long by 8 ft. wide and contains ample space for the wheel house, galley and captains quarters. Above all else the *Cumberland* is a working vessel designed and built for efficient and economical performance in a highly competitive trade.

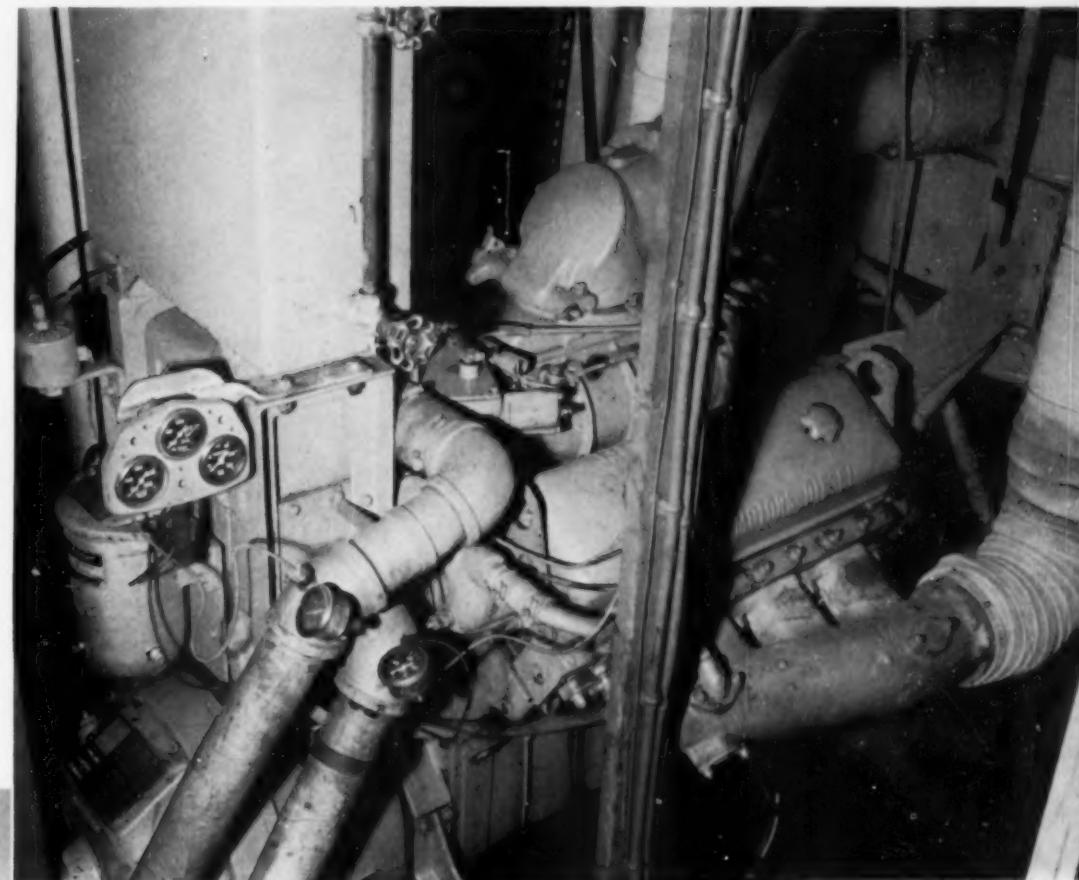
The southern shrimp industry has advanced to a high degree during the past ten or twelve years, with larger trawlers, engines with more horsepower and even some of the trawlers have hold

refrigeration. The industry, started around Fernandina Beach, moved along the southeastern coast line to Key West near where Capt. Buff Peterson discovered the Dry Tortugas bed and finally into the Gulf and the Campeche areas. About 2500 trawlers are engaged in this colorful industry and according to the Florida Development Commission, the 1958 shrimp catch was 51,697,000 lbs with a value of \$20½ million—the 1958 fish and shellfish landing totaled 169,100,000

lbs., all of which represents an increase of seven per cent over 1957.

DESCO also brought to the industry the so called *package deal*, a plan very popular with Gulf trawler owners. Before this idea, a trawler owner had to spend weeks handling the many details connected with the building of a vessel and equipping it, now the vessel comes all equipped and ready to work. Well aware of the importance that

Main office and stock receiving department of Diesel Engine Sales Co.



GM 8V-71 diesel engine on the *Cumberland* rated 308 hp at 2300 rpm. Installation also included G. M. Allison 4.5:1 hydraulic r&r gears, Perry water filter, CFC Fullo fuel oil strainer and Hilco secondary lubricating oil filters.

67 ft. *Cumberland*, owned by Alvin C. Dickey of St. Mary's, Georgia, on its trial runs on the San Sebastian River in St. Augustine.



a good grade of lumber plays in a trawler. Ringhaver, with an expert as an advisor, went to the several sources of supply and selected the top quality timber destined for use on future trawlers. Recently, to assure his grade AA supply, he purchased the Barnes Lumber Co. of Hastings and the Rivers Lumber Co. of Jacksonville. Both plants are equipped with the latest machinery and are leaders in their fields.

Another milestone in the history of the Florida shrimp industry was passed when the trim 72 ft. *Lady Kossie* slid down the ways onto the waters of the San Sebastian River. It was the 800th vessel to be launched at Diesel Engine Sales, a record unequalled in the annals of American shipbuilding and a fitting tribute to the Florida shrimp industry. Like the other 799 vessels launched by

this St. Augustine firm, the *Lady Kossie*, is the last word in marine craftsmanship. It is 72 ft. long and has a beam of 18½ ft. The pilot house built of cypress measures 24 ft. by 9 ft. and contains a Richie compass, Bendix depth recorder, Metal Marine Pilot and an Apelco ship to shore radio telephone. The new vessel has accommodations for a crew of four including the captain. The craft, a Tams designed Florida type shrimp trawler, was delivered to John C. Ferguson who heads the Estero Shrimp Co., Inc. of Fort Myers Fla.

The *Lady Kossie* is powered by a GM model 62207 RD (6-110) two cycle, 6 cylinder diesel engine with a total displacement of 660 cu. in. and overall is approximately 79 in. x 47 in. x 37 in. At 1800 rpm it has a continuous shaft horsepower rating of 220. Its approximate dry weight is 4300 lbs. The vessel is equipped with Allison Torq-



matic marine 4.5:1 hydraulic r&r gears and a 3 in. bronze propeller shaft which turns a four blade Columbian propeller to give it a speed of approximately 12 knots. The main engine also has two Donaldson air cleaners, a CFC Fulfilo fuel strainer and AC fuel filters and lubricating oil filters along with a Perry model 65 cooling system conditioner. The G. M. supplies power for the deck machinery and a 2000 watt 32/40 dc 53 amp Onan generator. Also in the engine room is a Petter 3 bhp diesel engine driving a Winpower auxiliary generator.

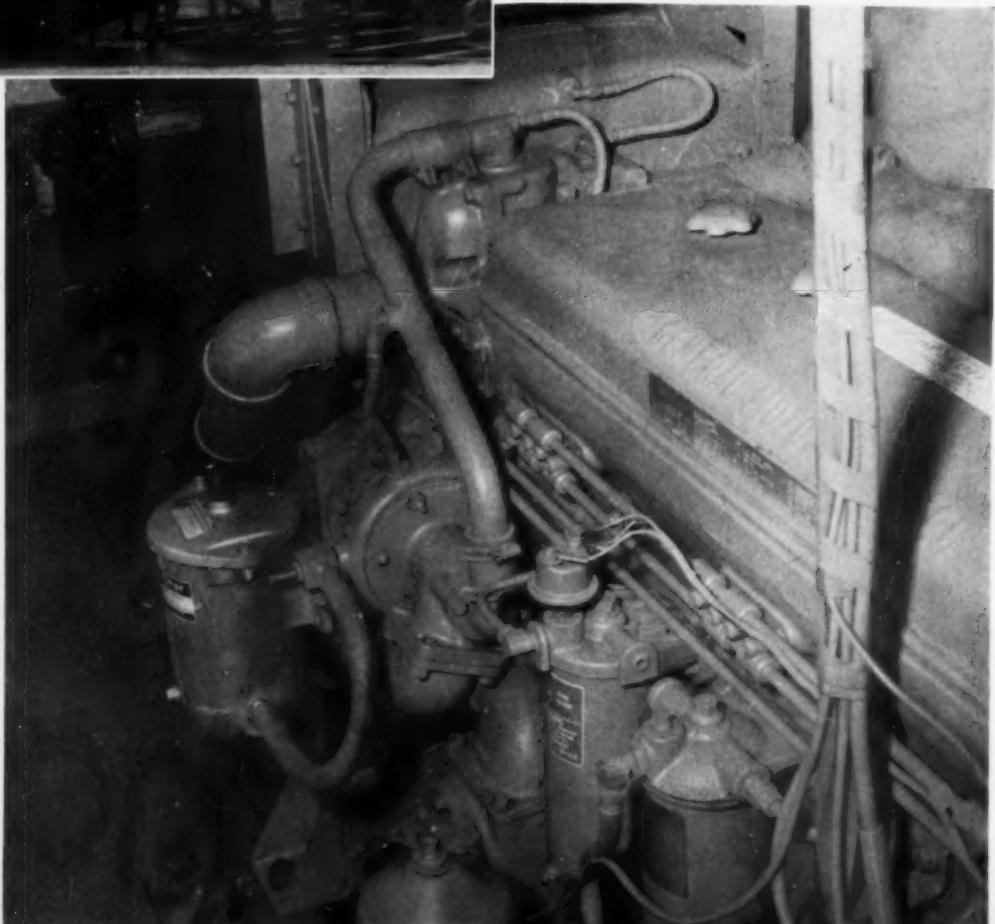
The *Lady Kossie*, named after the new owners wife, was christened March 7th 1959 by Miss Mary Lee Ferguson, his daughter, and was built at a cost of about \$52,000. Because of low tide, the actual launching was postponed until the next day. Guests at the christening had an opportunity to inspect what is probably the only commercial fishing trawler assembly line in existence. DESCO builds vessels pretty much the way Detroit builds automobiles. The assembly lines start at one end of the sheds and emerge at the river's edge as complete trawlers except for the outfitting which is done at outfitting docks.



↑ Guests on the christening platform included, L to R: an unidentified guest, E. Mitts, supt. of conservation, State of Florida, Geo. Codrington, John C. Ferguson, owner of the *Lady Kossie* and L. C. Ringhaver.

← The 72 ft. *Lady Kossie* before launching. It was delivered to the Estero Shrimp Co. of Fort Myers.

↓ The General Motors 6-110 diesel engine on the *Lady Kossie*, also shown is the Perry cooling system conditioner, Petter 3 bhp auxiliary diesel engine which drives a Winpower generator and CFC Fulfilo strainer.



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Station 106 Is One of the World's Largest Pipeline Compressor Stations. It Has 38,400 HP, and on Peak Days It Can Handle Better Than 1.7 Billion Cu. Ft. of Gas

By DONALD M. TAYLOR

TAKE a look at the map of Tennessee Gas Pipeline Company's system, and you'll understand why the company's Station 106 near Winchester, Ky., is necessarily one of the world's largest pipeline compressor stations. Five large diameter pipelines feed into it from the southwest, bringing natural gas from Texas, Louisiana and the Gulf of Mexico into the suction manifold at the rate of 1.7 billion cu. ft. every day. Inside the station's two large compressor buildings, 29 Clark engine-compressor units can compress this great volume of gas from a pressure of about 500 psi to 760 psi and discharge it into four pipelines that move it toward market areas. On peak days that usually occur when freezing weather sends the demand for gas soaring, Station 106 handles in excess of 1.7 billion cu. ft. of gas. To better appreciate the magnitude of this volume, consider it in terms of its dead weight. If it were possible to run this amount of gas across the weighing scales, it would

tally up to about 77 million lbs. daily! Translated into everyday terms, this is equal to the weight of nine freight trains of 100 cars each—fully loaded. Moreover, the total includes not only the weight of the cars and their cargo, it also includes the weight of the locomotives as well! No wonder it takes 38,400 hp at this station to handle the load.

Gas transmission by pipeline has turned into one of the biggest phases of the transportation industry and Tennessee Gas Pipeline Co., a division of Tennessee Gas Transmission Co., is one of the largest gas transporters. To move its gas to market, the company has installed 39 major stations with better than 600,000 hp in main line compressor units. Two additional compressor stations are nearing completion at this time. Virtually all this horsepower is on the line 24 hours a day except during overhauls and during other scheduled maintenance periods. The primary task of the

operators and the maintenance personnel is to provide both reliability in engine performance and a high degree of safety for personnel and equipment. Too, reliability is the prime consideration of Tennessee Gas Pipeline's design engineers because it is axiomatic in the gas industry that gas service must never fail. All of Tennessee Gas Pipeline's stations reflect these considerations in their design and operation. The large stations are divided into two or three separate plants, any one capable of operating without the other. Aside from the distinction of being the company's largest, Station 106 is fairly typical of Tennessee Gas' main line compressor stations. The two plants—"A" and "B"—have an equal horsepower of 19,200 apiece, although Plant "A" has only 14 engines to Plant "B's" 15. All of the compressor engines at Station 106 are of the same make; however, so far as is officially known, the company does not favor one engine manufacturer over the other. It uses all

Tennessee Gas Pipeline Company's system map. Winchester Station 106 is indicated by white dot.

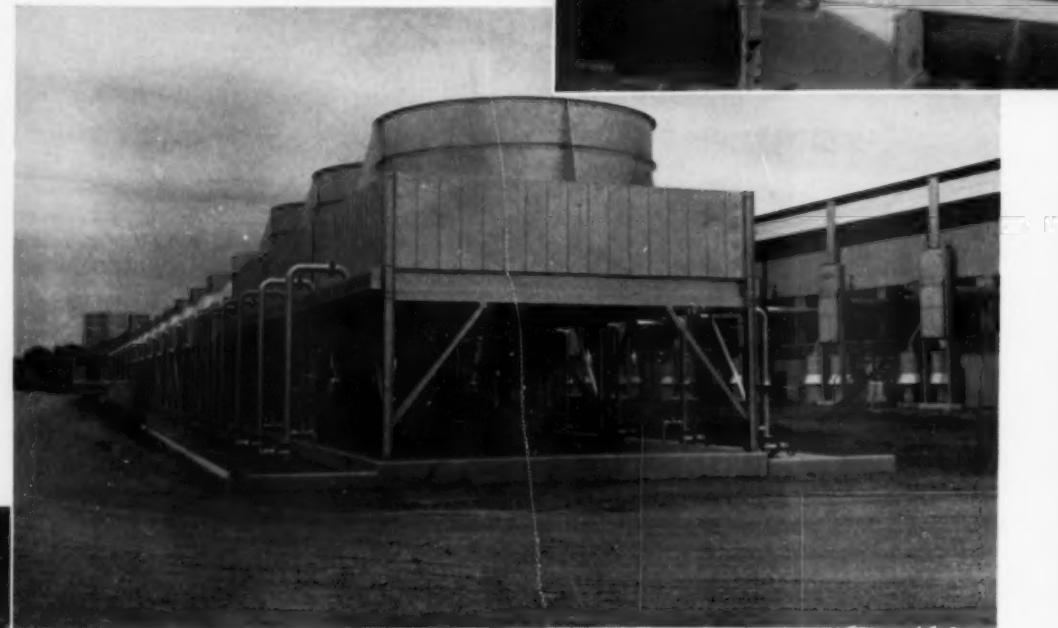


leading makes of engines, but adheres to one particular make of engine at each station to simplify maintenance programs. All of the engines at this station were manufactured by Clark Bros. Co. The "A" building houses eleven BA-6's rated at 1200 hp each and three TLA-6's rated at 2000 hp. All of the engines have four compressor cylinders with a considerable variation as to size. For instance, five of the BA-6's have four 11 in. dia. cylinders and six of them have three $8\frac{1}{4}$ in. and one 11 in. dia. cylinders. The three TLA-6's have four 13 in. dia. cylinders. The "B" building contains 15 engines: five are BA-6's and 10 are turbocharged HBA-6's, the latter being rated at 1320 hp each. Again there is considerable variation as to size of compressor cylinders.

It is obvious that with 38,400 hp in compressor engines, large quantities of cooling water will be

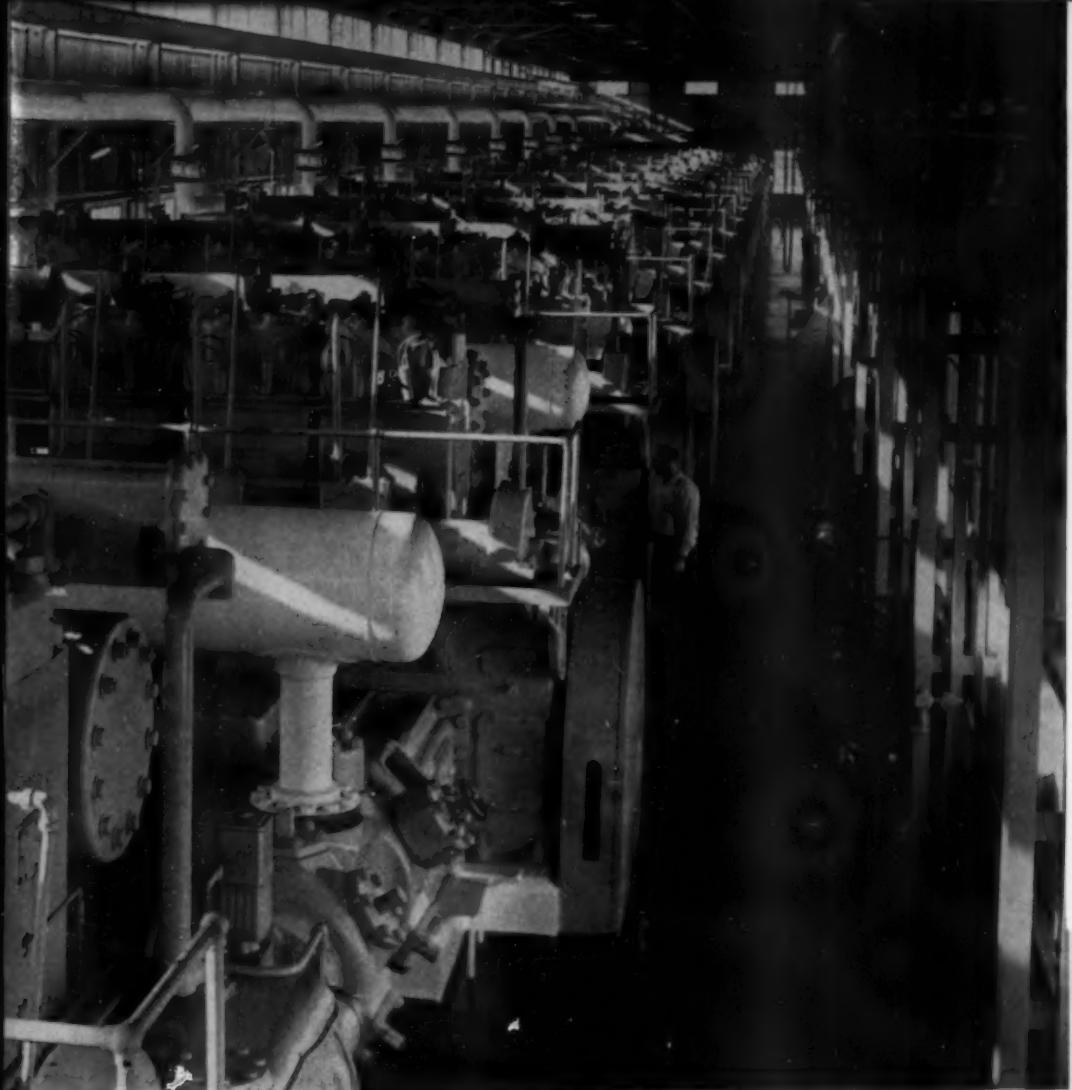
Electrical console in one of the auxiliary buildings. Each of the two buildings contains three 370 hp Ingersoll-Rand PVG-8's driving Westinghouse generators rated at 312 kva.

required for engine jackets and lube oil. The "A" plant equipment is handled by a three-cell, induced draft Marley cooling tower. Each cell contains four Griscom-Russell open type cooling sections with admiralty tubes and cast iron heads.



The tube area of each of the 20 sections is 455 sq. ft. "B" plant cooling is accomplished with induced draft atmospheric coolers. Three are Smithco Engineering 1-17 coolers with 20 hp fans. Each one will handle 233.5 gal. of water/min. with an inlet temperature of 160° F. and an outlet of 125° F. Ten of the coolers are American Locomotive Model 4-4-16's. Each of the latter will cool 208 gpm of water from 160° F. to 125° F. Split stream cooling is employed to handle different requirements of the engine jackets and lube oil cooling.

A station of this size requires considerable electrical power for the cooling tower and atmospheric



Interior of the "A" building which houses 14 Clark gas compressor units. Eleven of the units are BA-6's; three are TLA-6's. Horsepower of the latter is rated at 2000 each. Piping at the upper left is hot jacket water.

Atmospheric cooling sections which cool the "B" building jacket water and lube oil. There are 13 of these units which will handle from 208 to 233 gpm of water, cooling it from 160° F. to 125° F.

View of suction and discharge piping alongside the "A" building. At the right is one of the two auxiliary buildings which supply power for lighting, pumps and engine ignition. Marley cooling tower is in background.

cooler fans, cooling water pumps, lighting, and engine ignition. The station has Auxiliary Buildings "A" and "B". The two are almost identical. Each contains three 370 hp Ingersoll-Rand PVG-8's which drive 312 Westinghouse generators. As with most modern compressor stations, noise levels are watched carefully. Both intake air and exhaust are muffled. On the main engines two kinds of exhaust silencers are used: Maxim silencers, type 32, model MCUX, are used on all the BA-6's and HBA-6's and horizontal Burgess-Manning silencers, model BET-18's are used on the TLA-6's. All engines are equipped with backfire relief valves and combination intake air cleaners and silencers.



American Air Filters 36 and 46-WOI oil bath filters are used on most of the engines. Continental Air Filters A-65 whirlwinds are installed on several of the engines.

Each of the compressor and auxiliary buildings is equipped with a Hilliard Corp. oil reclaimer. Primarily, this equipment is used for reclaiming and treating oil after engine overhauls, and for frequent reduction of acid in the oil. All compressor engines are equipped with Hilliard "Hy-flow" FB-2X filters for control of acid. In addition, the TLA's are equipped with Perry Equipment Co. "Full Flow" RFF-42-366 filters.

Every engine has its own shutdown controls which can be actuated by high lube oil temperatures, high jacket water temperatures, and engine overspeed. In addition, the station has an emergency shutdown system which will close all plant inlet and discharge valves, and vent all gas inside the plant yard in a matter of minutes in case of trouble. This system works pneumatically. High pressure gas, stored in the emergency shutdown piping and in storage bottles, can be released into lines connected to pneumatic valve operators from several remote points. Only the half-turn of a valve handle is necessary to actuate this shutdown procedure, blowing off gas inside the plant limits and isolates the station from the high pressure gas pipelines. In addition, all electric service, including engine ignition, is interrupted at both compressor buildings.

No gas company can keep completely up to date with its engines. Once an engine is installed, the transmission company must operate until the engine can be economically replaced; and rarely will the fuel economy, low operating costs, etc., of a new model engine warrant discarding of an existing engine for replacement. Thus the problem of a gas company is to get the most from its engines year after year with the emphasis on preventive

maintenance. One of Tennessee Gas Pipeline's innovations in this regard is the use of digital computers to calculate and print engine performance records. Such use will prove valuable in determining longevity of certain parts and will aid in overall engine operations.

How much bigger will this station grow? Company officials decline to say. However, economists are predicting that the demand for natural gas will double before 1975; and an aggressive company such as this one will certainly move to supply a good portion of that demand. Likely, the station will be even larger yet.

TWO STAGE DRY AIR FILTER

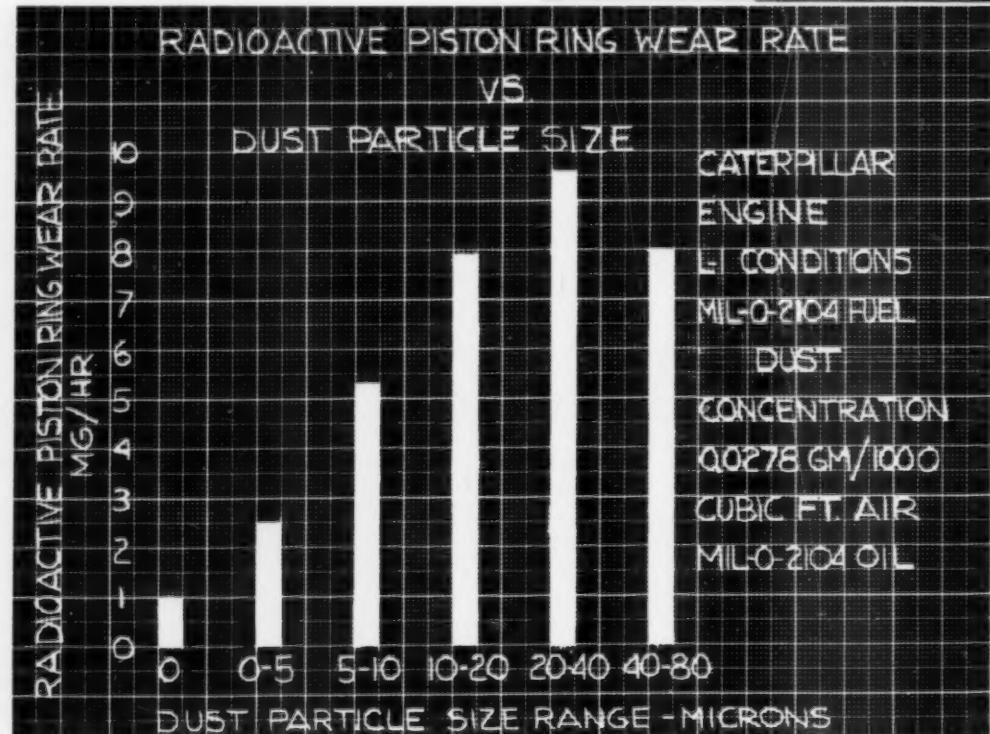
WIDESPREAD distribution will soon begin on a unique new type of air cleaner for diesel engines which has proved to be particularly effective in cutting down dust created engine wear, especially in dieselize off-highway equipment. The new cleaner, called the Roto-Pamic, is being produced by the Farr Company of Los Angeles. Result of several years of research and development work, the cleaner combines, in series, a centrifugal air cleaner and a disposable cartridge type paper filter. The centrifugal cleaner collects and discharges the larger particles of dust and dirt back to the atmosphere with the exhaust gases. "This first stage," explains S. F. Duncan, Farr's director of research, "is self-cleaning and essentially maintenance free. The pleated paper cartridge collects the extremely fine, light particles that might escape the first stage cleaner. The second section," Duncan continued, "is replaced when loaded, but because of the centrifugal pre-cleaner, life of the paper cartridge element is very long."

Farr research technicians and engineers began development of the new air cleaner after discovering that diesel equipped off-highway vehicles were sometimes operating in conditions with concentrations of dust as high as 100 gms/1,000 cu. ft. "Diesel operators," Farr points out, "were facing not only high maintenance costs but considerable actual engine replacement, inasmuch as even the two per cent of dust getting through a 98 per cent efficient filtration system wears out an engine in short order. An absolute filtration system with minimum maintenance and maximum life became our design goal," Farr said, "we were determined that the excessive dust concentrations encountered by diesel powered off-highway vehicles had to be dealt a lethal blow." The useful life of any internal combustion engine, Farr explains, is limited by dimensional changes of critical parts, such as piston rings, cylinders, bearings and cam lobes. When limiting dimensions are reached, the engine must be overhauled or replaced, no matter what caused the wear.

The close relationship between engine wear and combustion air dust has been established by tests using the radio active piston ring technique of the California Research Corp. and Farr Co. dust feeding equipment. The effects of dust particle size and concentration were measured in a 5 1/2 in. bore, 8 in. stroke Caterpillar diesel engine and the top compression rings were irradiated. Calculations derived from these tests showed that piston ring wear per unit weight of dust injected was a constant, with a very interesting wear curve resulting with ordinary road dust. The top compression ring wear rose to a maximum with increase in particle size diameter and fell off beyond a certain critical particle size range. The maximum wear occurred at about 30 microns. In the critical particle size range, wear was approximately 9 times the base wear.

Some abrasives, Farr engineers point out, cause only limited wear while others continue to wear as long as they are in the engine. "This character-

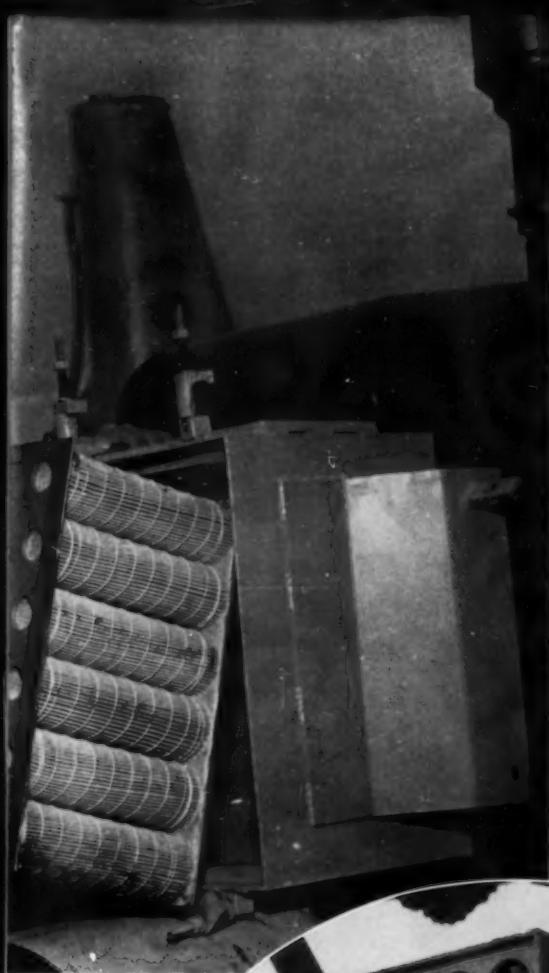
istic," explains A. W. Hardy, assistant director of research for Farr, "is related to the physical properties of the abrasive. The particles which are very hard cause high initial wear and a continuing higher than normal wear rate, indicating that they remain intact as long as they are in the engine. It is also possible," Hardy continued, "for hard particles to become imbedded in the metal parts. Particles of softer materials appear to be disintegrated during the initial wear process and become incapable of causing any further engine wear. There is evidence that piston rings are separated from the cylinder walls by finite distances, this separation apparently being caused by formation of a hydro-dynamic oil film. This would account for the low ring wear measured while feeding extremely small particles at low concentration. However, even particles in the 0 to 5 micron range classification in sufficient concentration can mud up between the piston and the cylinder wall and cause excessive wear." Wear measurements taken on a Detroit diesel 2-71 engine, equipped with a cyclonic paper after filter system, after feeding 10 gms/hr. of standardized fine air cleaner test dust for 1,500 hrs. were as follows: Liner wear, less than .0005 in.; piston wear, less than .0010 in.—



little crankshaft wear, less than .0005 in.; main bearings averaged less than .0005 in.; connecting rod bearings, less than .0003 in.; compression rings (thickness and width) maximum, .0025 in.

In the new type Farr cleaner, dust enters a cyclone inlet tube through deflector vanes which set up a cyclonic action. The dust particles are centrifuged against the walls and carried to a dust bin and eventually discharged back into atmosphere by the

induction of an exhaust gas aspirator. The remaining air reverses direction and spirals back along the discharge tube portions where a centrifugal effect again takes place. The filtered air then encounters the air straightening vanes which result in laminar air flow in a reverse direction through the tube outlets. The air and any extremely fine particles present are then filtered through the strainer type dry, pleated paper after-filter before entering the intake of the engine. Inclusion of a



Top—Here is the Pamic element showing the pleated paper cartridges.

Center—Farr cleaner showing deflector vanes. Unit was designed for cleaning intake air for both engine and compressor.

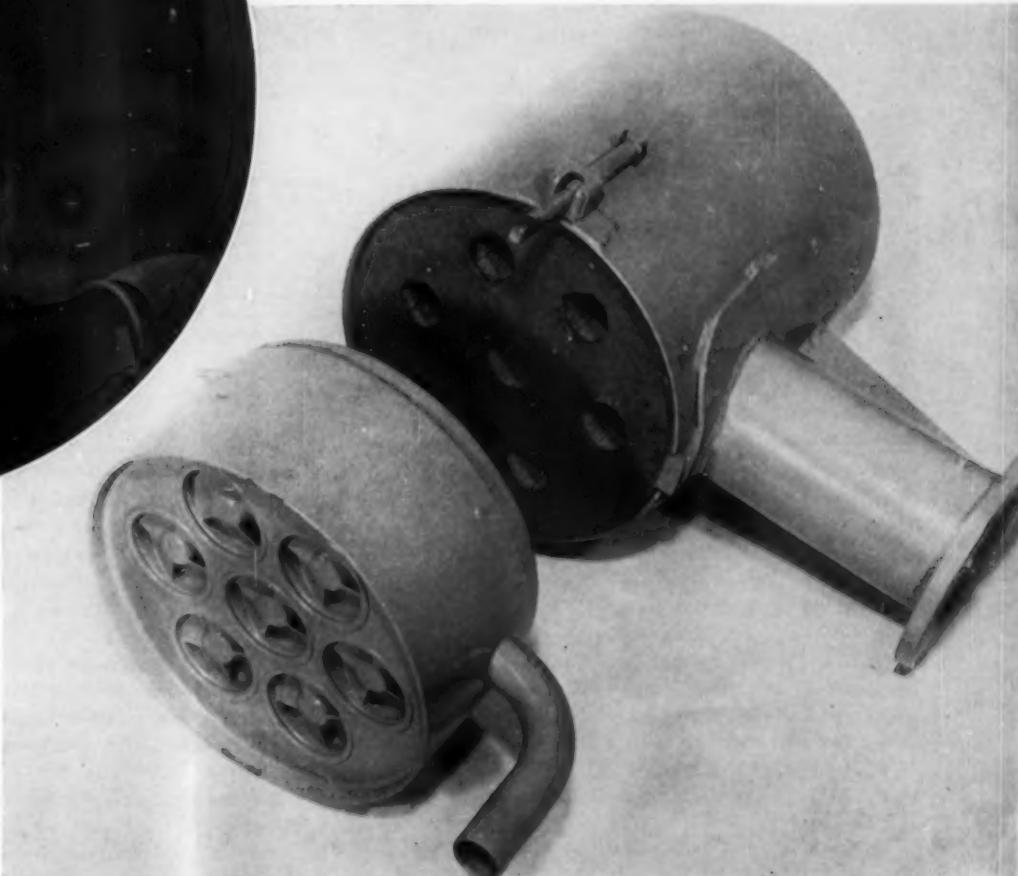
Two stage air filtration is achieved by combining in series a centrifugal air cleaner with pleated strainer after filter.

clean paper after-filter to the cyclone tube assembly results in no increase in pressure drop for the entire system. Each installation consists of a centrifugal type air cleaner and a strainer paper after-filter element. These two filters are held together in a steel housing complete with filter fasteners and intake air connection. The paper after-filter refill element is complete with gaskets to give positive sealing of the two filters. The dust is exhausted from the self cleaning cyclone filter unit by connecting the dust bin to an exhaust gas aspirator by means of a flexible hose. This hose carries the bleed-off air with the dust to the aspirator and is automatically discharged with the waste energy of the engine exhaust gases to the atmosphere. The aspirators incorporate a Venturi design which guarantees minimum pressure loss and maximum pressure recovery and properly applied they cause no detectable bad effects on a turbo-charger.

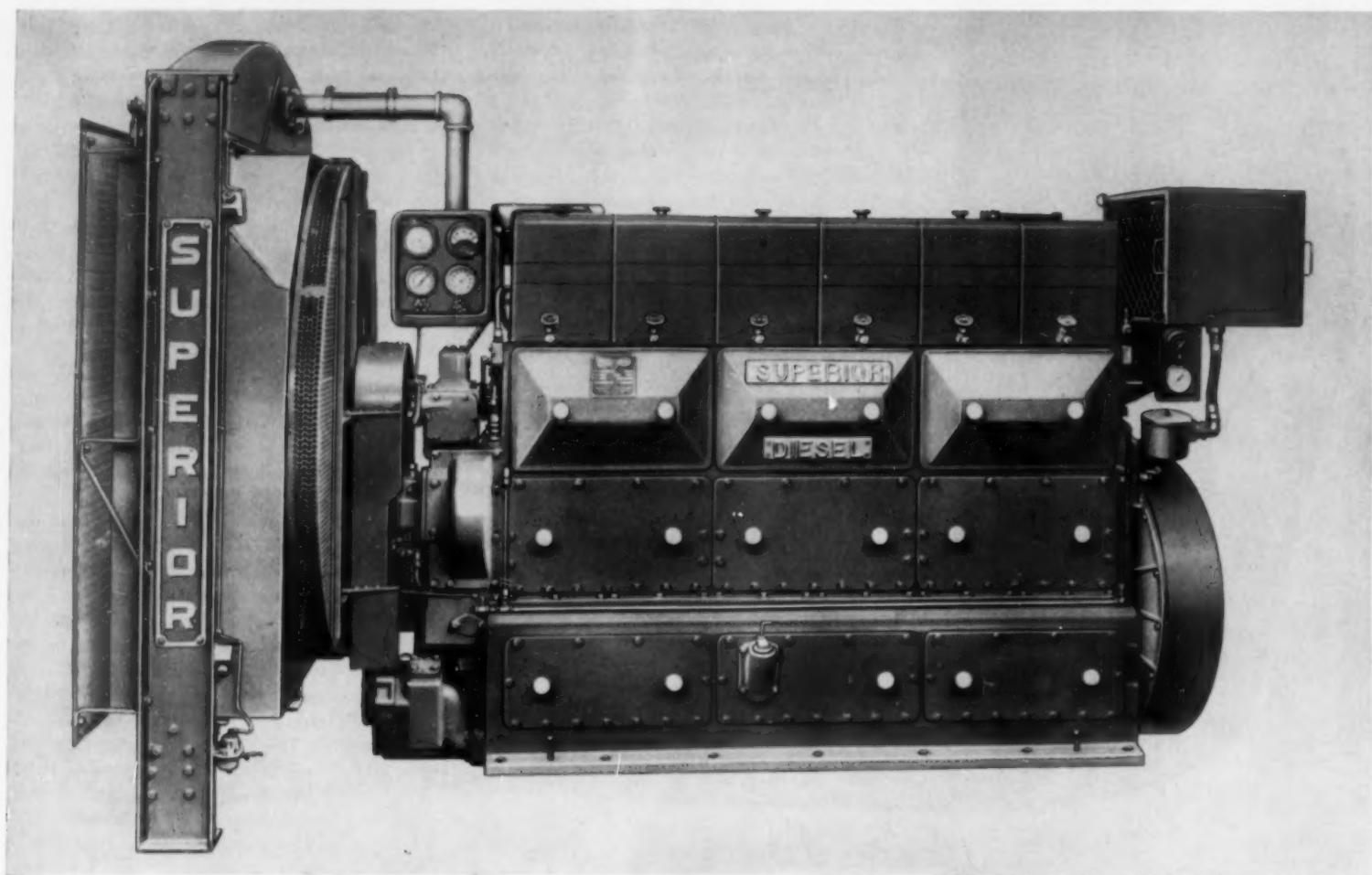
In one "in-use" test, a portable rock crusher using a Detroit diesel 6-110 previously had engine overhauls at about 800 to 1000 hours. Now, equipped with the new cleaner, the engine still shows the hone marks in the liners after 1,700 hours of operation. The changeout period for the paper filter has been 700 hours. Another special machine, dig-

ging and processing raw gypsum, driven by a Detroit Diesel 6-71 engine has turned in 450 service free hours using only one paper filter element. And an application to a D-9 Caterpillar bulldozer now shows over 300 hours on one paper filter. This crawler has been used in road building in Death Valley. In another test, two Euclid scrapers with Cummins diesel NRTO engines acquired some 1,000 hrs. each. These units are used to push away the overburden preparatory to mining Borax rock at U.S. Borax and Chemical Corp. at Boron, Cal. The overburden ranges from 25 to 80 ft. in depth and the units are also used in connection with carryalls to haul away the Borax rock after it is mined with an electric shovel. The initial system pressure loss was 2.4 in. w.g.—no load, full throttle. It is now 5 in. w.g.—no load, full throttle and the operator claims a rise to 13 in. of w.g. under full load, full throttle conditions.

One company, engaged in sandblasting buildings, applied the new filtration unit to the engine and compressor intakes in late April of 1958. The combined air intake is filtered in a single filter assembly with the aspirator on the engine exhaust, operating to bleed the dirt out of the cyclonic section. Previous practice was to change the engine oil every 80 hrs., clean or replace the compressor lube oil filter every 40 hrs. and clean both air cleaners every 20 hrs. Since installation of the new cleaner system, the unit has run more than 320 hrs. and the air filter resistance has increased only about 1 in. w.g. The engine oil was checked at 120 hrs. and the owner reports it was clean enough to run another 120. The compressor lube oil filter now lasts up to 160 hrs. before maintenance is required and in only 8 weeks of operation, a total of \$288 was saved in labor and material that would otherwise have gone into maintenance.



NEW DRILLING ENGINE 450-550 HP RANGE



Fully tested, this new White Superior PTDS-6M engine will be shown for the first time at International Petroleum Exposition in Tulsa.

A NEW drilling engine model has been added to White's Superior PTD series of drilling diesels. Designated the PTDS-6M, the engine incorporates a space-saving turbocharger arrangement resulting in a compact unit of 450-550 hp capacity for drilling service. The oil field power unit requires only 120 in. along the base including space for radiator. "With the advantage of the past two and a half years experience with our PTD drilling engines, we offer this additional model to give the drilling contractor a better selection of rig power," commented W. F. Burrows, vice president and general manager, White Diesel Engine Division. "This basic arrangement has been field tested in a variety of applications".

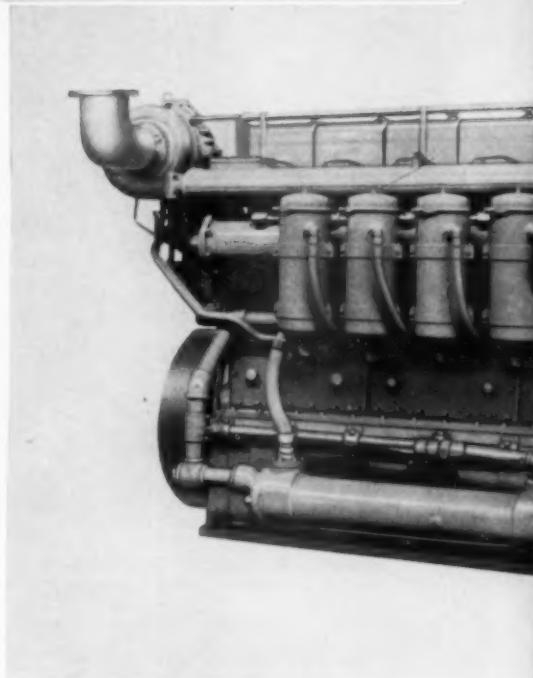
White's Superior PTDS-6M with its space-saving turbocharging arrangement is rated 450 hp continuous, 500 hp intermittent, and 550 hp maximum for drilling service. Among its design features is an open chamber combustion system. This design mechanically permits space for wide valve overlap with the piston at the top of its stroke and allows a blast of cooling air through the entire chamber substantially reducing temperatures of upper cylinder walls, piston crown, injector tip, exhaust valve and seat. Advanced developments in the engine's combustion system include improved

Exhaust side view of the engine showing full flow filtration system. In addition, there is a double element thermostat and a bypass permitting the jacket water to quickly warm the lube oil during cold starting. Shown are Ross lube oil heat exchanger, Winslow lube oil filters, Purolator fuel oil filter and Elliott Turbocharger.

individual fuel pumps and injectors, optimum fuel spray pattern, and improved 'swirl' and turbulence achieved by specially designed contours and streamlined shape of valve ports. "Operation on low cost fuels and crudes is practical for the entire PTD series because of the open combustion system," stated a White spokesman.

Here is a description of the major components: *Camshaft*. The same heavy camshaft is used as powers the higher output PTDS-6. Camshaft rigidity and refinement of drive details result in smooth performance.

Crankshaft. Standard equipment for smooth power under all loads, the crankshafts are precision machined, statically and dynamically balanced.



This permits fast acceleration, and prolongs the life of the engine and its accessories by smoother power flow.

Box-type base. The engine base, designed especially for heavy-duty oil field service, provides a

fully bedded, distortion-free support for the crankshaft.

Cylinder block. Engine inspections, maintenance, repairs . . . and when necessary, complete major overhaul can be made right on the rig. All internal parts are readily accessible from both sides of the block through large openings with removable covers. This makes "stand-up" servicing both practical and convenient.

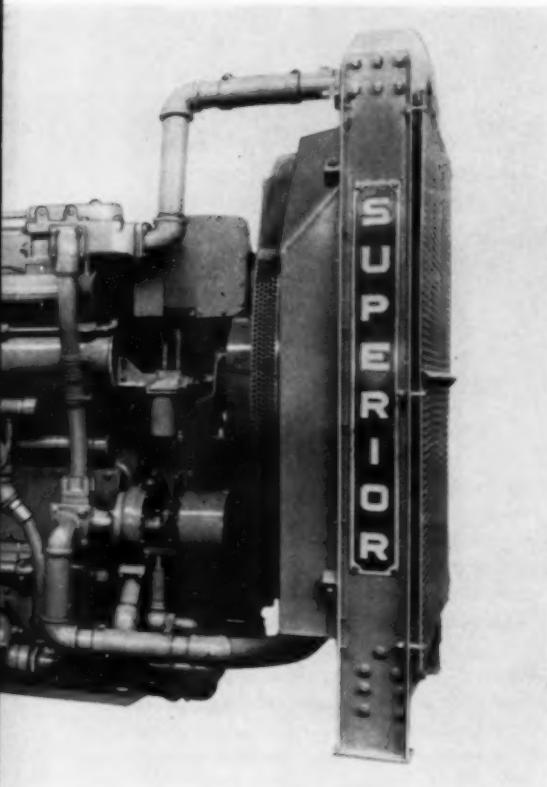
Pistons. The design of the piston dome provides ideal conformance to the fuel spray pattern, great strength, long wearing qualities, uniform expansion and fast heat transfer. Four compression and two oil control rings are used.

Connecting rods. For exact uniformity, connecting rods are carefully weight calibrated. These H-section forgings are heat treated and precision machined.

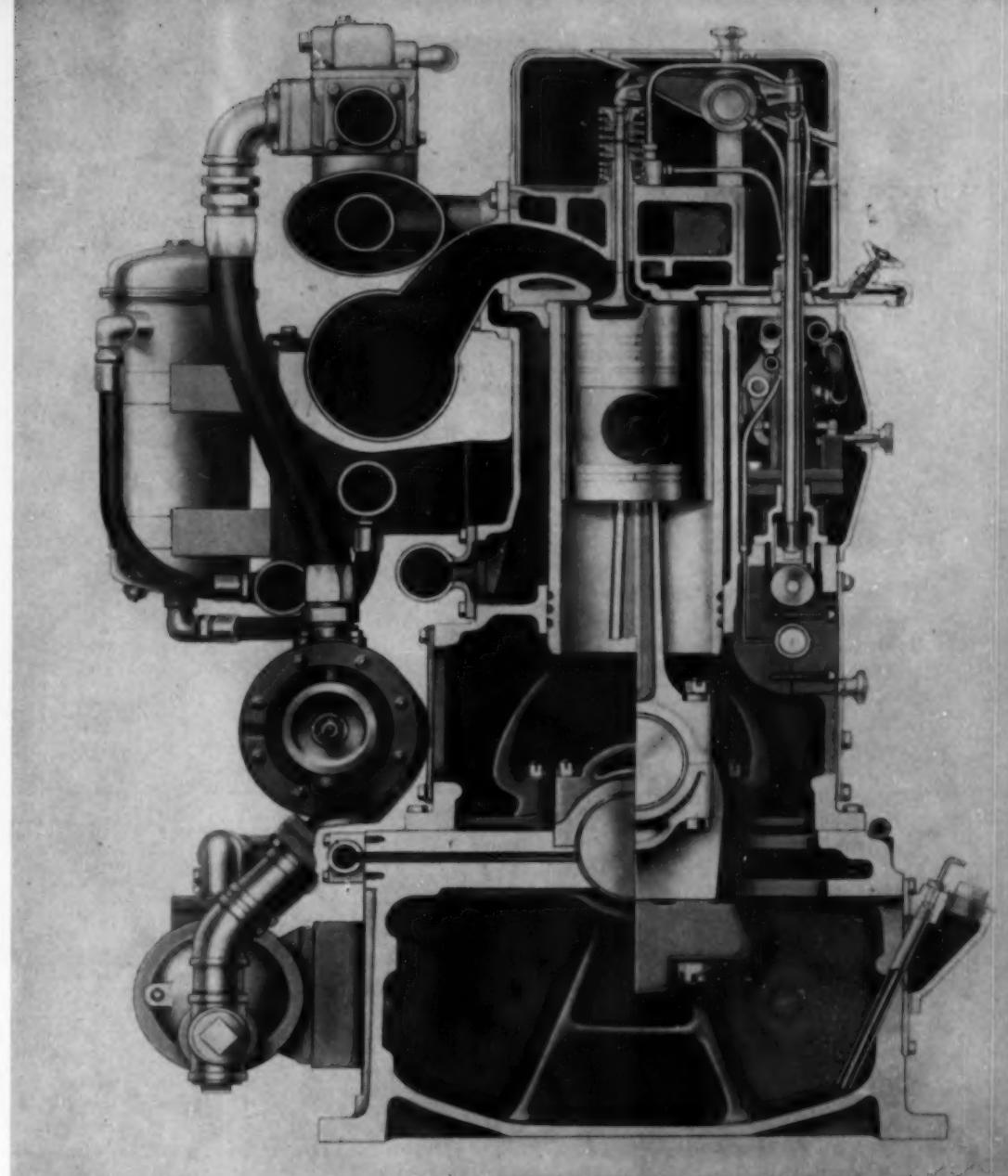
Cylinder heads. Each cylinder head is an individual casting. Use of two valves in each head provides simplified rocker arm construction. Valve port contour and streamlined shape achieves high 'swirl' to induce complete combustion. Dry joint between cylinder head and block guarantees no water leakage at gasket surface.

Valves. Positive rotation of each valve has been provided. Both inlet and exhaust valves are made of special alloy steel. Dual valve springs provide positive action.

Lubrication system. A high capacity engine-driven pump and a new type pressure regulating valve positively maintains a constant, full pressure of lubricating oil for proper lubrication . . . whether



hot or cold, and at widely varying engine speeds and loads. Engine mounted full flow lube oil filters, and a shell-and-tube heat exchanger are provided as standard equipment. External auxiliary sump is not required.

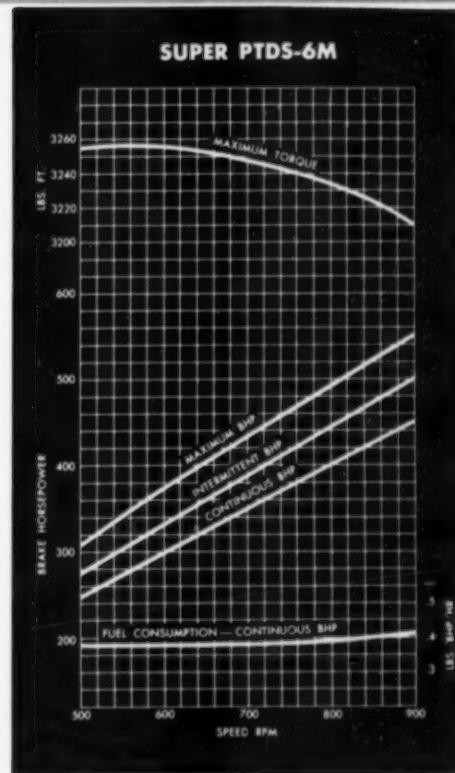


Schematic cross section of the PTDS engine.

Curves indicate actual usable horsepower performance of standard stock engines equipped with all accessories, including radiator and fan. No correction necessary to 1500 ft. elevation and 90° F. All curves are for engines operating on diesel fuel conforming to approved specifications. Fuel consumption curves, in lbs. per bhp are based on the continuous rating of engines equipped with all accessories, including radiator and fan. Intermittent bhp curve indicates power available for mud pump and rotary table.

A rating summary of White's Superior PTD diesels, including the new PTDS-6M is as follows:

	Continuous HP	Intermittent HP	Maximum HP
Super PTD-6	365	411	455
Super PTD-8	485	545	605
Super PTDS-6M	450	500	550
Super PTDS-6	560	630	700
Super PTDS-8	750	840	935

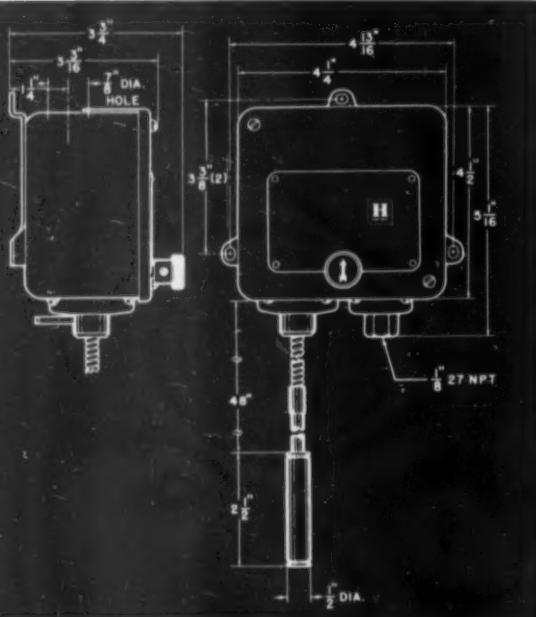


NEW DIESEL

SAFETY CONTROL

NOW in production by the Brown Instruments Division of Minneapolis Honeywell is a compact safety switch designated model P618A. This new control is designed specially for use on internal combustion engines for protection against damage from too high coolant temperature and/or too low oil pressure. The controller case may be mounted in any convenient position on a reasonably solid surface such as a panel, duct, tank or wall and three mounting lugs are provided.

The controller is provided with a switching arrangement which responds to abnormal temperature or pressure to stop or idle the engine or actuate an alarm circuit. It consists of two separate systems mounted on a common frame and compactly enclosed in a substantial metal case. The temperature system is a remote bulb, capillary and diaphragm which measures engine coolant temperature. In the pressure system, a stainless steel diaphragm measures engine lubricating oil pressure. Each system has an independent micro switch to actuate the final engine control element or alarm circuit. These switches will either make or break on temperature rise and pressure drop.

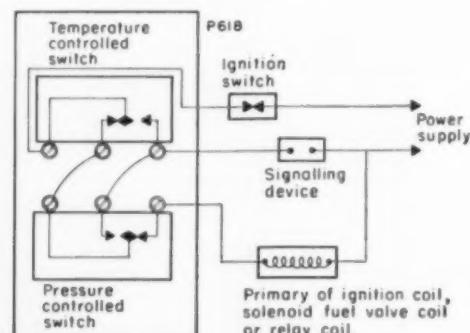


External knob at front of control provides manual start-stop operation of pressure mechanism.

Temperature and pressure scale plates are easily accessible by removing front of case.

These are three main operating features on the model P618A:

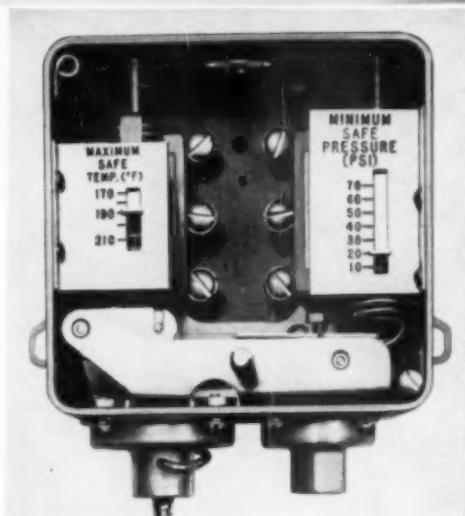
1. The temperature measuring system has an exclusive fail-safe feature. This system operates below atmospheric pressure, with the diaphragm spring-loaded in tension. In case of a break or leak in the bulb, tube or diaphragm, pressure of the inrushing atmosphere will operate the switch



Typical hook-up of P618A.

Approximate dimensions of control.

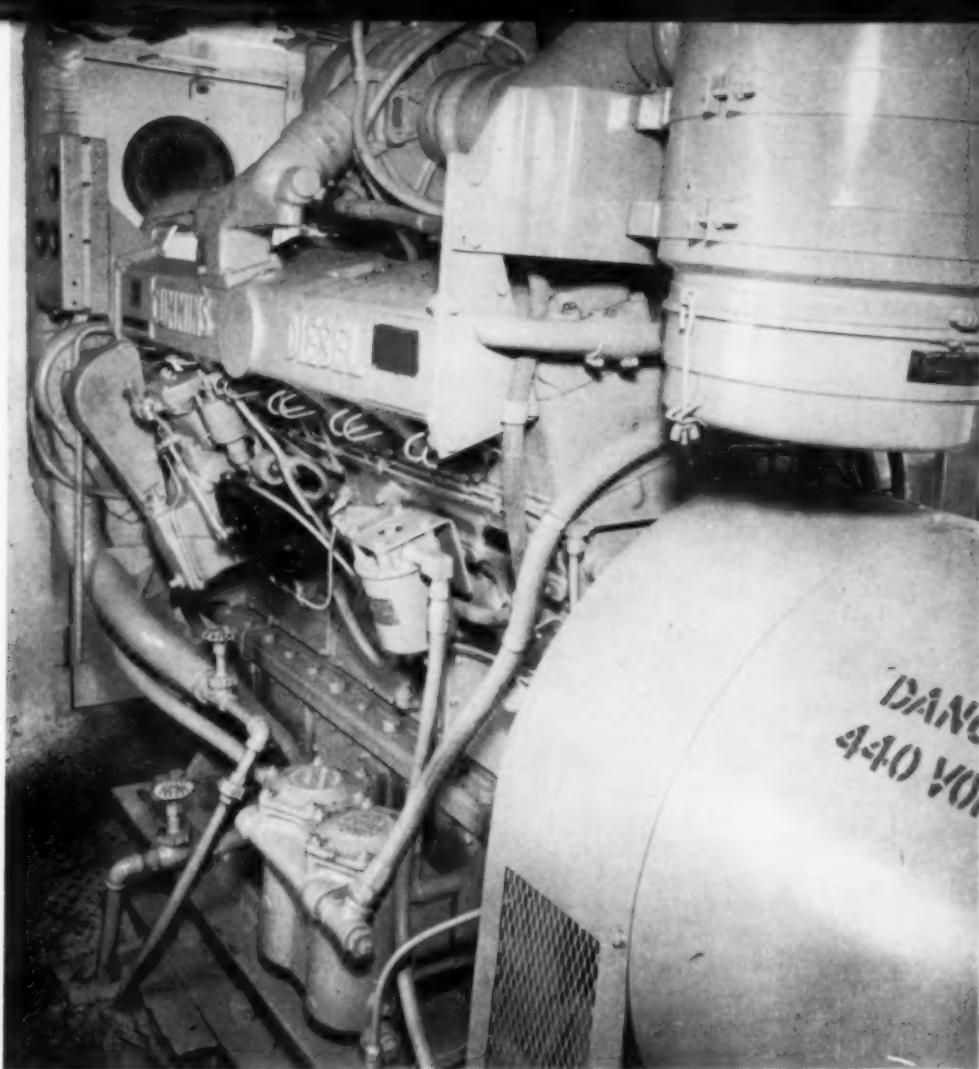
closing the circuit. The controller will fail "safe" by responding as it would to excessive temperature, stopping the engine or actuating the alarm. 2. An operator can readily adjust set points for temperature and pressure in the field. These adjustments, with their graduated scale plates,



are inside the case for protection against tampering. They are conveniently reached by removing the front of the case.

3. Temperature and pressure settings cannot drift off the set points, regardless of vibration. There can be no false shutdowns.

The unit also contains a mechanical means for selecting Start, Run, and Off position of the switches, an adjustable pressure sensing unit and an adjustable temperature sensing unit. All elements are enclosed in a splash-proof case with cover. The Start, Run and Off functions are selected by a knob conveniently located on the front of the case. Specifications of the model P618A show that it has a pressure range of 5 to 75 psi and temperature ranges as follows: 165 to 215° F. with scale markings 170, 190, 210° F.; 205 to 250° F. with scale markings 210, 230 and 250° F.



Typical installation of Cummins 575 hp, 300 kw VT-12 diesel-generator set. Note Vortox air cleaner.

connected with the fuel supply tank of the locomotive, doubling the fuel capacity from 1,100 to 2,200 gals. The former steam generator fuel supply piping is used to feed fuel to the auxiliary engine which consumes a maximum of 22 gals./hr. under full load. A special control cabinet containing all relays and control apparatus for starting and automatic paralleling of two or more generators was constructed and mounted in the compartment. Cables for the carrying of electric power to the train were run the length of the unit inside the car body.

The bi-level trains differ from conventional streamliners not only in their general exterior and interior appearance, but also in many basic operating characteristics. The cars are 15 ft. 10 in. high, almost 2½ ft. higher than conventional equipment. Their "king size" allows for spacious seating on two levels for 96 coach passengers as contrasted to 56 seats in ordinary streamliner coaches. The diesel-electric power plants provide clean, even heat and air conditioning, and eliminate the need for heavy steam pipes, noisy generators, compressors and related equipment normally carried under conventional cars. A variety of plastics and other synthetics add to the attractiveness of the cars and the comfort of passengers. The Cummins diesels, in this new kind of service, have been operating continuously since they were put into service last October. A total of six VT engines are in service to date. Each of the trains uses two locomotives, while a fifth unit is on standby in Chicago and another is on standby in Green Bay, Wis. The latter is in continuous service providing heat in spare cars.

The new trains, which cost approximately \$2½ million, were designed with special emphasis on passenger comfort, according to C. J. Fitzpatrick, the railroad's president. "This equipment may well be setting the pattern for passenger trains of the future," said Fitzpatrick. "The bi-level trains have many efficiency features conducive to reducing cost of maintenance. No efficiencies, however, were adopted in the train design if they tended to detract in any way from our major objective: a comfortable, relaxing ride for the passenger in a pleasant atmosphere."

AUXILIARY DIESELS FOR BI-LEVEL STREAMLINERS

DIESELS are playing a key role in the Chicago and North Western Railway's dramatic breaking of a century old tradition in passenger train design. Chicago and North Western's new bi-level streamliners are among the first trains in the country to be heated, lighted and air conditioned entirely by electric power provided by conventional diesel-electric locomotives. They have been in service since last October, operating between Chicago and Ishpeming, Mich.

To prepare the power units for the new trains, four 2250 hp model E-8 Electro-Motive locomotives were modified in the North Western's diesel shops. The steam generator in each locomotive was removed, and in its place was installed a 300 kw auxiliary diesel-engine driven alternating current generator. Cummins 575 hp VT-12 turbocharged diesel engines were selected by the North Western because their compact size facilitated the installation. In addition to conversion of four E-8 model locomotives for regular service with bi-level trains, two 1500 hp F-7 units, formerly used for freight service, have been similarly modified to serve as standby units for the trains.

Here's what the North Western's locomotive experts did to convert its locomotives for bi-level train service. The steam generator and all associated

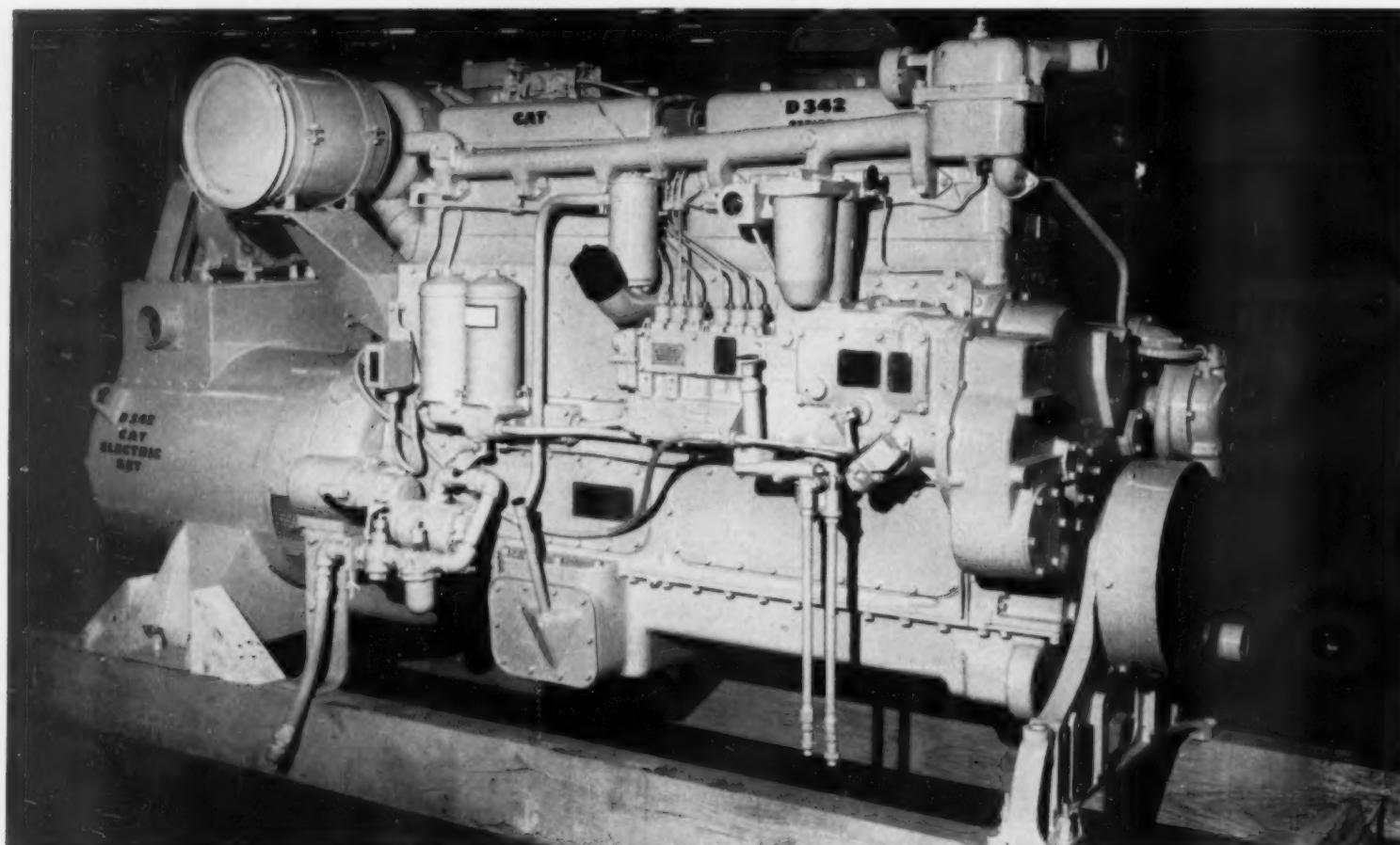
wiring and piping were removed from the steam generator compartment. The 300 kw power package, furnished as a unit by Cummins was installed in its place. It consisted of a Cummins VT-12 engine and a Marathon 480 volt, 60 cycle alternator, and all necessary controls. The equipment was bolted on a skid to aid removal as a complete unit if necessary. Radiators and electrically driven fans were installed in the roof of the locomotives. The former boiler water supply tank was inter-

One of the North Western's 2250 hp Electro-Motive diesels and bi-level coaches.



CATERPILLAR TURBOCHARGES THE D342

New, Higher Output Diesel Carries Intermittent Rating of 260 BHP; Available for Industrial, Marine and Generator Set Applications



NOW in production at Caterpillar's Peoria works is a new turbocharged version of the Company's D342 diesel—an engine that has been widely used through the construction industry for powering excavating machines, crushers, etc., as well as the Cat D8 track-type tractor. Key to the higher output of the new D342 series C engine is turbocharging, however officials of the Company's Engine Division point also to design improvements, principally new exhaust porting and manifolding, that have contributed to this increased efficiency. Manifold changes give the engine a lower profile dimension and more compactness.

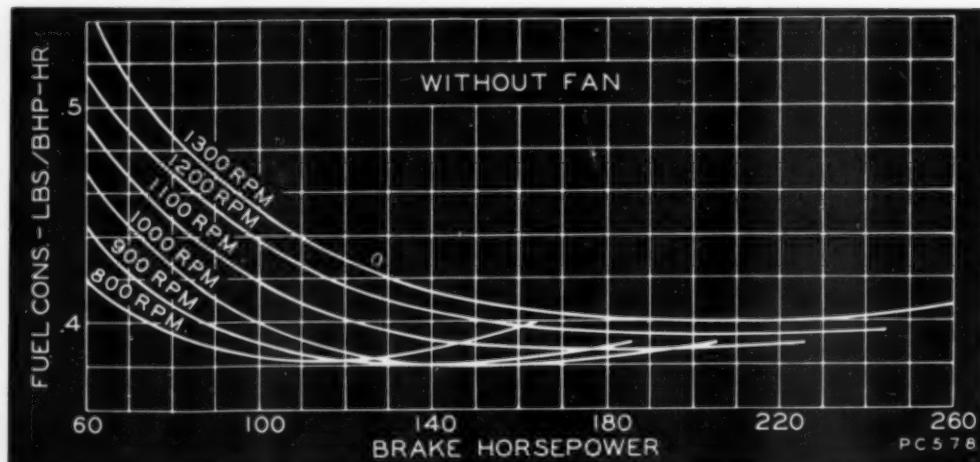
The new engine is now available in several configurations for a broad range of applications. The industrial engine has an intermittent rating without fan of 260 bhp at 1300 rpm and has a continuous rating of 220 bhp at 1200 rpm. The series C electric set develops a continuous rating of 150 kw, 187 kva, 3 phase, 60 cycles at 1200 rpm with available voltage arrangements from 120 to 2400. Continuous rating for the marine version with Twin Disc MG 512 reverse and reduction gear (2:1 or 3:1 ratios) is 220 hp at 1225 rpm, both forward and reverse. The engine is also available in two spark ignition versions with 7.5:1 or 10:1 compression ratio.

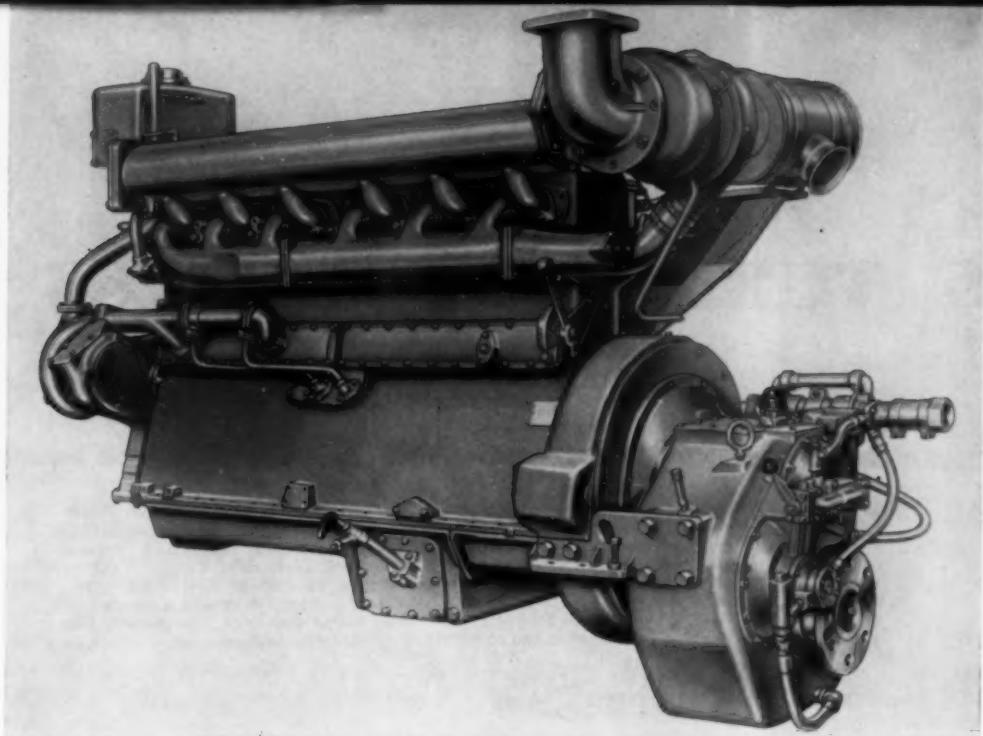
The D342 series C is a four-cycle engine with six cylinders of $5\frac{1}{4}$ in. bore and 8 in. stroke. Similar to all other engines built by Caterpillar, it employs individually-pumped single orifice fuel injection valves with no balancing required. The fuel transfer pump is gear-driven with a suction lift of 12 ft. To lower the profile, Caterpillar engineers have designed the engine with the exhaust manifold on top and the intake manifold runs along the side of the engine. A new dry type air

Turbocharged D342 series C Caterpillar electric set in Peoria plant. Unit has continuous rating of 150 kw at 1200 rpm.

cleaner is standard and it is rear mounted with the turbocharger. An oil bath filter is offered as an attachment.

Fuel consumption curve of D342 C-T without fan.





Following are the general specifications of the major engine components and systems:

Bearings: 7 main bearings, 3.75 in. dia. Main and connecting rod bearings are aluminum, precision type.

Connecting rods: H-section design, rifle-drilled for

cooling oil.

Cooling system: Closed type, or marine type, thermostatic water temperature control. Gear driven centrifugal water pump.

Crankcase: Strongly reinforced, one piece, alloy cast iron with large inspection plates.

New Twin Disc MG-512 reverse and reduction gear is available in 2:1 or 3:1 ratio on the Cat D342 series C marine diesel engine.

Crankshaft: Forged high carbon steel with induction hardened journals.

Cylinder head: Molybdenum alloy cast iron with water directors and removable precombustion chambers.

Cylinder liners: Removable wet type, induction hardened alloy cast iron, chemically treated for "break-in."

Lubrication: Full pressure system, includes gear-type pump and full flow disposable filter elements.

Governor: Flyball type, spring balanced.

Pistons: Aluminum alloy with cast iron top ring band and stainless steel heat plug.

Starting system: Air, electric or gasoline available.

	Industrial	Electric	Marine
Length (in.)	90.44	122.07	105.42*
Width (in.)	43.50	43.50	43.50
Height (in.)	59.55**	59.55**	68.37**

*Includes 8 in. companion flange

**Excluding exhaust pipe

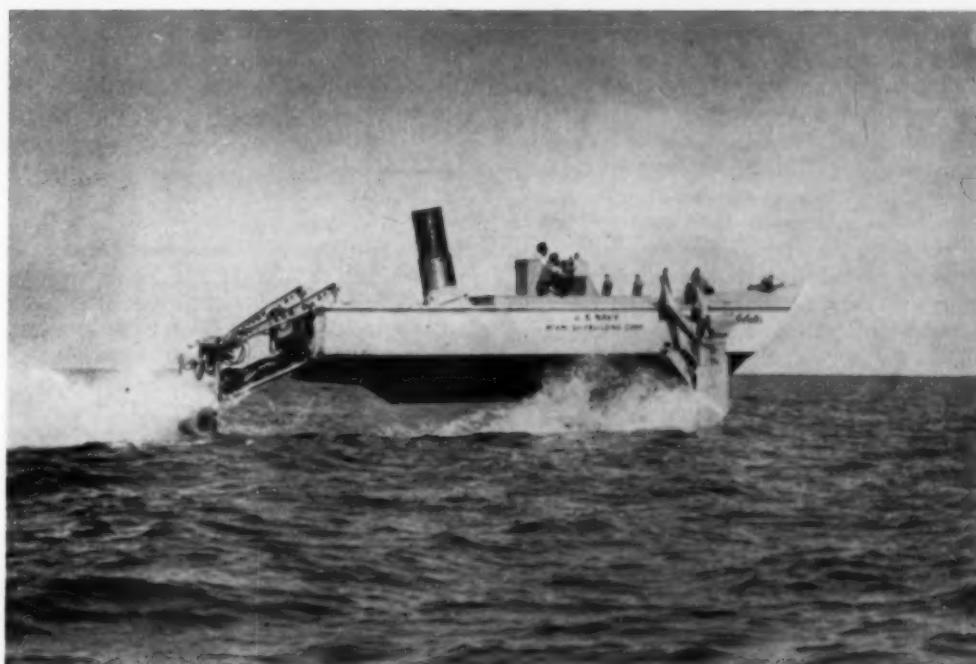
The approximate weight, net dry lbs of the D342 series C is as follows: industrial-5650; electric set-8120; marine-7050.

FIRST TURBINE POWERED HYDROFOIL

THE U. S. Navy recently unveiled a radically new water vehicle which incorporates airplane-type hydrofoil "wings" and a gas turbine engine, which is normally used to power aircraft and helicopters. Dubbed *Halobates*, the craft is powered by a Lycoming T53 gas turbine engine, essentially the same unit that powers such helicopters as the Bell HU-1 Iroquois and the Kaman H-43B Huskie as well as several other types of aircraft. The 860 shp power plant, coupled with the hydrofoils, has propelled the 15 ton landing craft at a speed in excess of 30 knots, three times the speed normally associated with such craft.

Development of *Halobates*, the world's first turbine powered hydrofoil, began several years ago when the Navy's Bureau of Ships awarded a contract to Miami Shipbuilding Corp., Miami, Fla. Development of the propulsion and control systems by Avco Manufacturing Corporation's Lycoming Division, began at the same time. Sea trials of the converted LCVP began in September 1958, in the Gulf stream and have included successful operations at maximum gross weight in moderate to heavy sea states. The application of gas turbines to this type of craft promises to have the same effect upon boat design as the jet engine has had on aircraft design. The turbine engine offers high power in a small package, thereby permitting radically efficient changes in hull design and construction. The high torques developed by the Lycoming T53 turbine enable the new hydrofoil boat to literally "fly" straight out of the water.

The aerodynamically shaped "wings", or hydrofoils, serve the same purpose as do airplane wings. When the craft is in motion, these hydrofoils re-



The Navy's newest research boat, *Halobates*, employing hydrofoils and powered by a Lycoming T53 gas turbine engine. The landing craft has been undergoing sea trials since Sept., 1958.

duce the pressure above them in relation to the pressure below. This gives lift to the hydrofoils, which are firmly fixed to the boat. When a predetermined speed is reached, this lift becomes great enough to cause the entire boat to rise above the surface of the water with only the hydrofoils remaining in the water. Dr. Anselm Franz, Lycom-

ing vice president of turbine engineering, and the man responsible for the design and development of the T53, said that the engine being used in *Halobates* is a standard aircraft model adapted for marine use. It had been delivered to Miami Shipbuilding about two years ago, installed in the boat, tested and in operation ever since.



GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

Boeing Gas Turbines*

IN 1946 the U. S. Navy Bureau of Ships became interested in the Boeing turbine program, and supported it with research and development contracts. In 1950 a substantial production contract was negotiated with the Bureau of Ships for mine-sweeping boat (MSB) generator-drive engines. Continued Bureau of Ships support of the Boeing turbine program has contributed significantly to its progress. All Boeing production turbines to date are classified in what is known as the 502 series. Both shaft-power and air-compressor versions of this series engine have been produced. Basically, a 502-series engine is a two-shaft gas turbine in the 150 to 300 hp range, having a gas-producer section and a power-output section which are gas-connected only, and mechanically separate. The gas-producer section, which is identical for a shaft-output engine and its air-compressor counterpart, consists essentially of a single-shaft centrifugal compressor, two through-flow burners, and an axial-flow turbine wheel, shaft-connected to the compressor impeller. The power-output section contains a second axial-flow turbine wheel which in the case of the shaft-power engine drives the output shaft, through reduction gearing, (output shaft speeds optional). In the air compressor en-

gine, the second-stage wheel directly drives a centrifugal "load" compressor.

Operating Record

On Jan. 1, 1959 eighty-five 502-10C and eight 500-10C engines have been delivered for marine application. As of Oct. 1958, forty-nine of these engines were in operation and had accumulated a total of about 4450 hr. There had been a total of 202 outages of these operating engines for scheduled and unscheduled maintenance. There has thus been one engine outage for about every 22 hr. of operation. Best data available to the Boeing Service Unit show that each outage consumed an average of about 3.5 man-hours. This would indicate a maintenance factor (maintenance hours to operating hours) of 16 per cent. This data for 502-10C engines cannot be considered too meaningful at this time inasmuch as no engine as yet has reached the scheduled teardown inspection or overhaul period. However, it is believed that the engines have now been "de-bugged" to the point whereby unscheduled outages for further retrofit changes will be unnecessary, and engine reliability markedly improved.

Conclusion

Any manufacturer which has produced over 700 turbine units on a production schedule with such extensive follow through on service should be ready to market their engines to the public demand. Boeing now proposes to do just this and will soon offer on the market standard turbine-powered equipment, some typical examples of which are as follows:

1. A single-engine marine propulsion package, complete with reverse gear, and all instruments, accessories and controls; optional equipment, including vee-drive, will be available. The unit is for vessels requiring approximately 200 hp. This package will be termed *Boeing Turbo-Mariner*.

2. A dual-engine marine propulsion package, in which two engines, driving through separate reverse gears, and a combining gear, provide over 400 hp to the propeller shaft. This unit is to be called the "Twin Turbo-Mariner."

3. A 100 kw, ac, 60 cycle, emergency generator

package, complete with switchboard and controls. This set will feature such items as speed recovery within 1 sec. after application of full load, steady-state speed variation of less than 0.15 per cent, and full-speed operation within 10 sec. after actuation of the start system.

4. A standby electric generator steam unit which will provide 100 kw ac, 60-cycle, electrical power and 1600 lb. per hr. of steam at 150 psig. Speed recovery and steady-state speed variation will be the same as for the emergency generator mentioned. Steam is obtained through use of a waste-heat boiler.

Other turbine packages under development include a 10-to 60-cycle per sec., 100 kw variable-frequency generator set; a family of salt-water pumps ranging in capacity from 2200 gpm at 125 psig to 1500 gpm at 175 psig; and a hydraulic winch.

Table 2

Boeing Gas-Turbine Marine Applications

Application	Year of Initial Service	Engine Model	Engines (Including Spares)
PROPELLION			
Navy Personnel			
Boat	1950	502-2	1
LCVP	1951	502-2	1
MSL	1954	502-8C	6
LCVP	1957	502-10C	12
MSL	1958	502-10C	39
Commercial Personnel Boat	1957	502-10C	8
			67
AUXILIARY			
Generator			
Drive-MSB	1953	502-6	253
Generator			
Drive-MSL	1954	502-8C	2
Generator			
Drive-MSL	1958	502-10C	30
Fog Generator	1957	500-10C	8
			293
			TOTAL 360

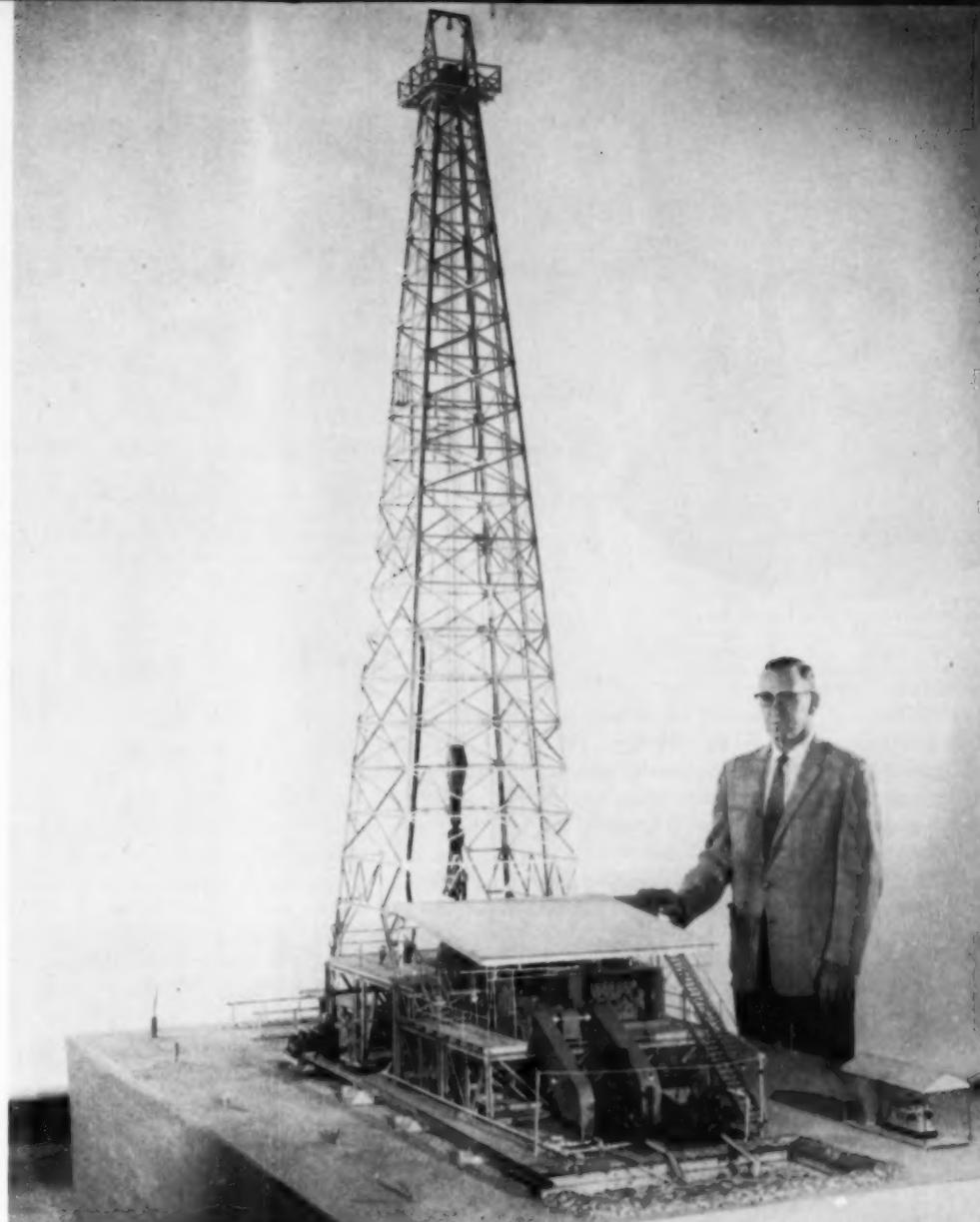
*Abstract of ASME paper 59-GTP-8 by V. A. Yeager presented at the Gas Turbine Power Conference, Cincinnati, Mar. 1959.

*Current Production Models.

MODEL RIG IS MARVEL OF PRECISION

EVEN old time drillers would have a hard time distinguishing the photographs of this model rig from the real thing. Its builder—Harold Bennett of Dallas—spent 3,000 hrs. of incredibly painstaking work to make sure that it was accurate down to the tiniest bolt. Mr. Bennett started building his model rig three years ago in his spare time and ended up by turning his garage into a small machine shop. As it turned out, though, his passion for authenticity proved well worthwhile. Value of the model has been estimated at \$25,000. Built to $\frac{1}{8}$ th scale, the rig is a marvel of miniature precision. Everything works exactly as on a real rig. The drill pipe is raised and lowered by the draw works. The rotary table turns the stem. Tiny air clutches engage and disengage with air. Even the mud is real. The mud pumps have removable liners. The drill pipe has standard A. P. I. tool joints. Mr. Bennett is Petroleum Industry Manager at the Dallas Branch Office of Twin Disc Clutch Company. All six clutches on the model rig are reproductions of Twin Disc and the fluid couplings are also Twin Disc. Here is a complete list of the equipment used:

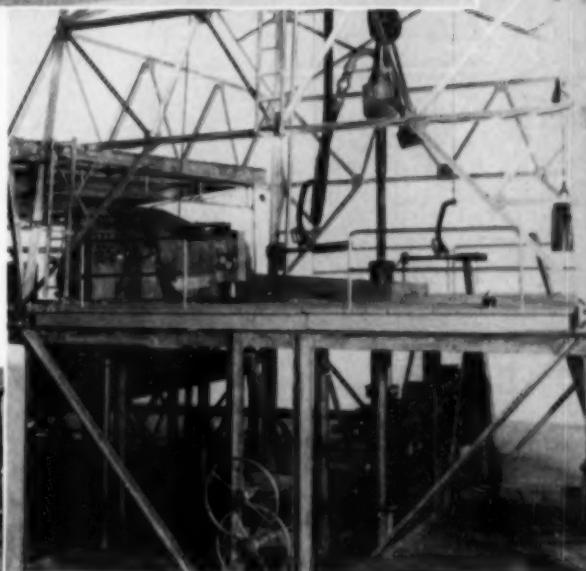
Pumps	Emsco Model D-500 and D-1000
Derrick	Emsco Standard 136' (300 ton)
Draw works	Brewster N-95
Catheads	Emsco "Air Spinning"
Crown and traveling block	Brewster (300 ton)
Swivel	Oil Well
Rotating Air Unions	Deublin
Rotary table	Ideco 27"
Hook & elevators	Byron Jackson
Tongs	Web Wilson
Engines:	Waukesha Model LRORBU
Shale shaker	Link-Belt
Drilling controls	Martin-Decker
Fluid coupling	Twin Disc Model HUD 27"
Master and pump clutches	Twin Disc Model PO-224



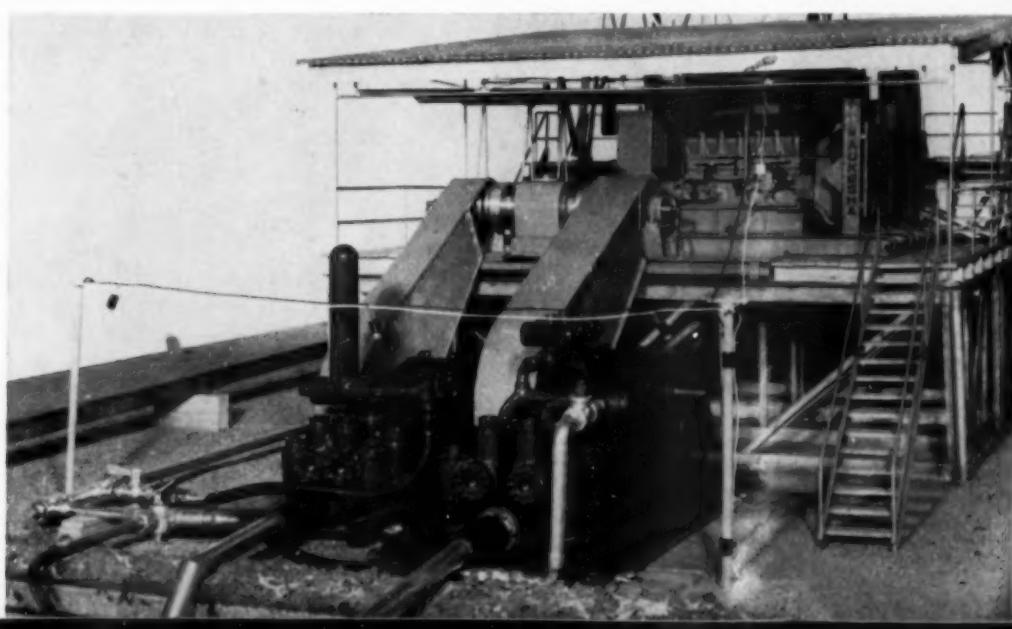
Harold Bennett stands beside his model drilling rig which Twin Disc will exhibit at the International Oil Exposition in Dallas.

Rotary clutch ... Twin Disc Model PO-218
Lo drum clutch ... Twin Disc Model PO-236
Hi drum clutch ... Twin Disc Model PO-230

Twin Disc plans to demonstrate Mr. Bennett's model rig in operation at the International Petroleum Exposition in Tulsa.



This closeup shows the surface drilling equipment used on the model rig. The traveling block supports the rotary hook and the swivel. To the left of the rotary table are the tongs used to tighten drill pipe sections.



A closeup of the mud system on Harold Bennett's model rig shows the startling realistic detail of the slush pumps and the Waukesha diesels.



WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

A New Ruston Range

RUSTON and Hornsby in Lincoln have broken new ground in the development of their latest AT range of diesel engines by utilizing, for the first time in this country, extensive electronic computer calculations to determine optimum design characteristics. Development work on the new range began some years ago and, throughout, the subject was approached from the point of view of laying down a specification, which would leave ample margin for development up to the highest foreseeable b.m.e.p.s. It was accepted from the outset, that the new range would be built only in turbocharged form, and that the majority of engines would also have intercooling. As the work proceeded, moreover, a number of radically new constructional ideas were developed, which resulted in simplification of design, combined with improved mechanical performance. The operating cycle, for example, has been based upon the results of no fewer than 6348 cycle calculations carried out on an electronic computer and, during these electronic computations, the effects of many independent variables were studied. These included boost pressure ratio, intercooler outlet temperature, effective engine compression ratio, maximum cylinder pressure, trapped air/fuel ratio, engine expansion ratio and scavange air excess. In each calculation, the specific fuel consumption, b.m.e.p., exhaust temperature and scavange pressure drop were determined and the results were plotted on special three-dimensional graphs. Owing to the large number of variables which were investigated, it was necessary to stipulate certain items as fixed when each three-dimensional graph was drawn. This led to the production of a series of graphs which give a clear guide to the improvements of performance which can be obtained by varying such factors as the boost pressure ratio, the maximum cylinder pressure, and the Atkinson ratio. In the initial development work on the AT range, the engines have been run at b.m.e.p.s up to 180 lb./sq. in., and most of the testing so far has taken place at up to 160 lb./sq. in. b.m.e.p.

Meanwhile, development is being pushed ahead to the higher ratings for which the engine has been designed, and a program is also in hand for the development of the combustion system of the engine for gaseous fuels. The AT range is based on cylinder dimensions of 12½ in. bore by 14½ in.

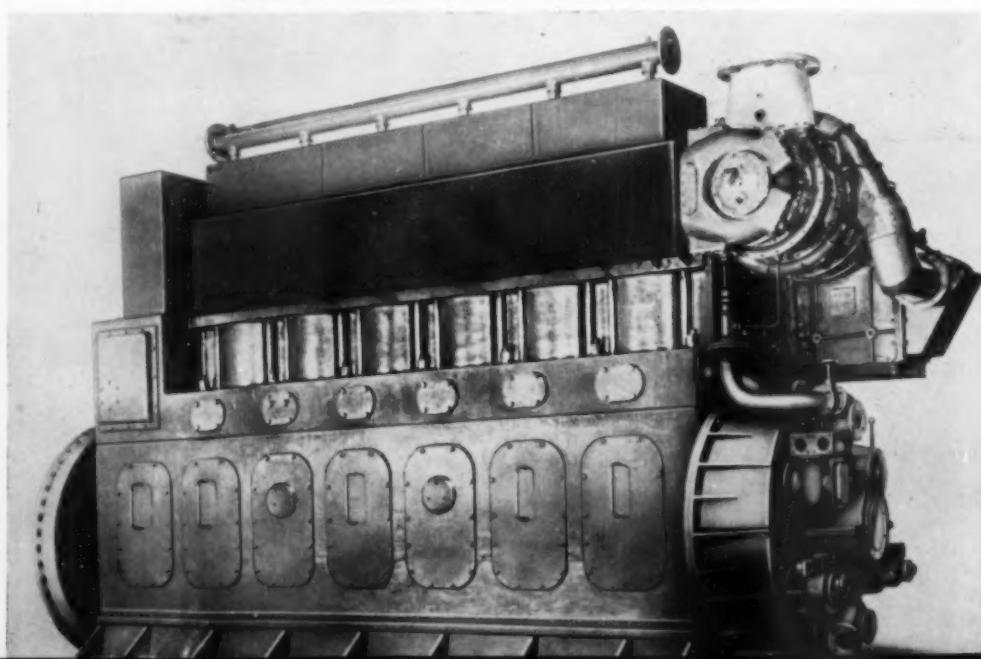
stroke and units with from five to nine cylinders are available. In its normal turbocharged form, the power range at 520 rpm is from 715 b.h.p. in the case of the 5-cylinder unit up to 1280 b.h.p. for the 9 cylinder design. When intercooling is incorporated, these figures increase to 910 and 1645 b.h.p. respectively. The results so far obtained from tests on the new engines and the very few mechanical troubles experienced, vindicates according to G.B.R. Feilden, engineering director at Rustons, the view that with modern techniques, the design of diesel engines can be placed upon a quantitative basis, just as has been done with other types of prime movers. Consequently, the engine has had a sound fundamental basis from the outset.

Among the important design features worthy of particular note is the adoption of a very rigid crankcase design, providing dimensional stability for the main bearings both from the point of view of alignment and the maintenance of bearing circularity under load. In the cylinder block casting, flat surfaces have been avoided, so as to enable the cooling system to be operated under pressure.

A high level camshaft has been used, which acts directly on rollers at the ends of the valve rockers and on the fuel pump tappets, so giving a valve

system of minimum inertia and great simplicity. The crankshaft is forged by the "constant-grain-flow" process and has balance weights providing 97.5 per cent compensation for the rotating forces in the engine. No torsional vibration damper is necessary. Versatility in installation and auxiliary equipment is a further important feature of the AT range. The seating of the cylinder block on the crankcase is symmetrical, and this makes it possible to build "handed" engines for marine propulsion or other applications, from standard basic components. The full power of the engine can be taken from either end of the crankshaft, which has identical flanges at each end. This feature, coupled with the great inherent torsional stiffness of the crankshaft, considerably increases the number of applications which can satisfactorily be met by the standard engine without the need for introducing extra equipment. Reverse rotation engines are available, and these use entirely standard parts except for the camshaft. Auxiliary drives can be taken from five separate positions on the engine. These are right or left-hand side of engine at flywheel end, by chain drive; right or left-hand side of engine at free end, by chain drive; front of engine by resiliently-mounted gear drive, which can be arranged to drive up to six separate items of auxiliary equipment.

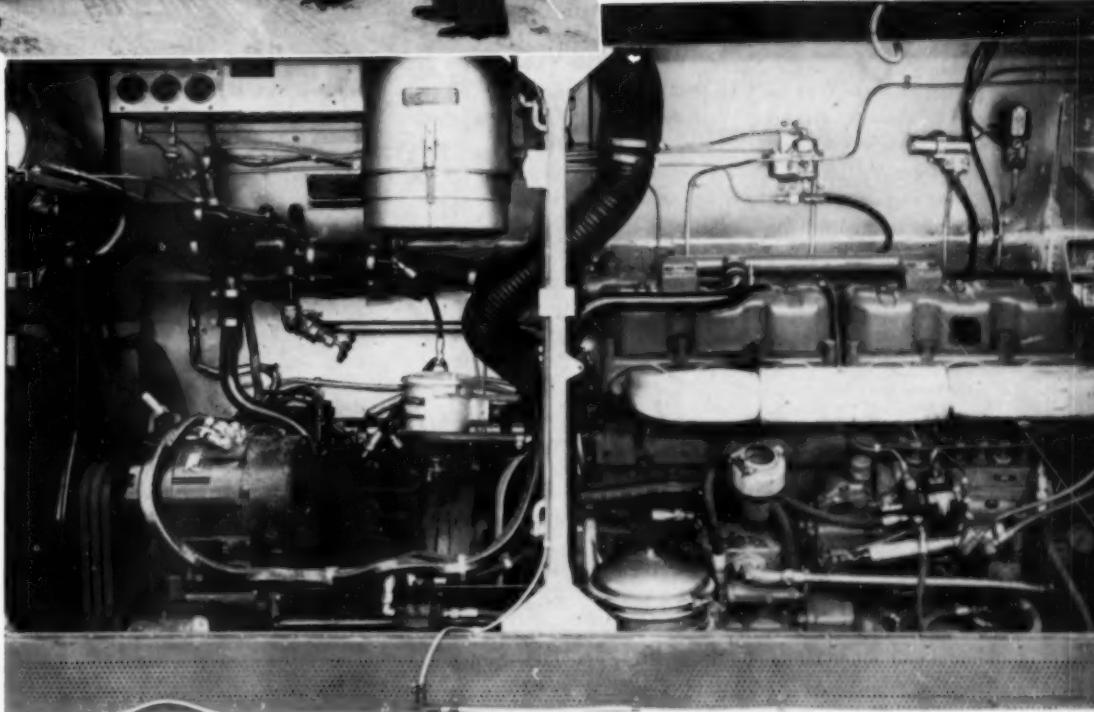
Ruston AT engine with intercooler and turbocharger arrangement. Special front end cover provides drives for up to six auxiliaries in position.





President Roswell F. Thoma, left, and Superintendent of Equipment William W. Kunz, Niagara Frontier Transit System, look over one of the first of the 60 new Mack buses.

Rear engine compartment with the 205 bhp Mack diesel, Spicer torque converter, Vortox air cleaner, Luber finer oil filter, Perry water filter, Puro-lator fuel filter and American Bosch fuel pump. Generator is Lecce-Neville and starter, Delco-Remy. All of the Mack engines serving Niagara are equipped with Schwitzer turbochargers.



60 NEW BUSES FOR BUFFALO

By ROBERT DYMENT

FIRST of their kind in the world, 60 new Niagara Frontier Transit System buses, manufactured by the Mack's Trucks, Inc. and powered by a Mack END Thermodyne 673 diesel engine, will soon enter service in Buffalo, N. Y., the third largest city in the state. Featuring a distinctively different front end design, the exterior color scheme has been modified to include a gold panel and belt line. The huge curved windshield provides panoramic vision for the operator. Dual headlights and enlarged direction signals are included. The new buses incorporate many new features for added passenger comfort and convenience. Lower steps, wider aisles and seats, and increased knee room afford added riding comfort. Foam cushion seats and seat backs are spaced with the windows, and set at a comfortable angle. Further improvements have been made in the fluorescent lighting and in the automatically controlled heating and ventilating system. Each bus has a seating capacity of 50 people.

Mr. Roswell F. Thoma, president of the Niagara Frontier Transit System said, "These 60 new buses, the first of their kind in the world, are the last word in metropolitan bus design. They will

be assigned to service on various routes throughout the city. At a cost of \$30,000. each, they represent an investment of \$1,800,000. by NFT in further improvement of transit service for the people of Buffalo." Mr. Harold R. Fouss, sales manager of Mack's Bus Division, said the new look coach was produced at the request of bus operators across the nation who have been anxious for a change in the conventional transit bus design. The powerplant for NFT's sixty new buses is a Mack ENDT 673 engine—having six-cylinders, 672 cu. in. displacement, a bore and stroke of 4 $\frac{1}{2}$ by 6 in. and a compression ratio of 16.59 to 1. It develops 205 bhp at 2100 rpm governed speed. Maximum torque of 560 lbs. ft. is at 1500 rpm.

Drive is through a Spicer 183 torque converter to three $\frac{1}{2}$ in. V belts. Safety while testing or tuning the engine is provided through duplicate controls as well as pressure and temperature gages located in the engine compartment. Each Mack diesel is equipped with a Schwitzer Turbocharger to boost power output to the rated 205 hp.

The policy of the Niagara Frontier Transit System is to use the newer buses to the maximum extent possible, supplementing them only during peak periods with older equipment. Under this policy the 60 new buses will be scheduled to perform approximately 50,000 miles each during the current calendar year.



DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Personnel Management

ONE of the important phases of Service Management is the hiring of new personnel. The procedure for hiring should be planned so that a man selected will be an asset to the future growth and reputation of the Service Department. The four basic steps that must be included in making a selection are: reception, interview, application form, and investigation. Properly applied, these four steps will do much to eliminate costly personnel turnover. When interviewing an applicant, it might be well for the Service Manager to think back to the time when he was interviewed for his first job to determine how he felt. Were the relations pleasant? Was he at ease? Did he and his interviewer both make a good impression on each other? Very likely the answers to some of these questions will be "no".

The Reception of an Applicant:—A good reception is essential because the applicant is greatly influenced by his first contact. To get the most out of an interview, a prospective employee should be met in a friendly, courteous manner—preferably in private. Efforts should be made to make the applicant feel at ease and free to talk. Such feelings will enable the applicant to be comfortable and to transmit a better idea of his abilities and capabilities. In addition, the applicant should be comfortably seated so that he will be relaxed in mind as well as body. It is a known fact that some people do not think well when they are on their feet. With such treatment, the applicant will feel that the Service Manager has consideration for people and that the company would be a good one to work for.

Interviewing an Applicant:—The purpose of the interview is to secure and exchange information. The applicant is trying to sell the Service Manager on how good a man he is and the Service Manager is trying to sell the applicant that his place of business is a good place to work. In other words, the interview is a two-way street. The applicant wishes to obtain information he needs in order to determine if he wants to work for the concern, and the Service Manager is desirous of

obtaining certain information in order to determine if the applicant is the man for the job. Among the things a Service Manager will want to know about the applicant are his qualifications, his personal habits, his past experience, past employment, family status, and the types of engines, vehicles, or equipment, with which he is most familiar. While the Service Manager is probing for the answers to his questions, the applicant is anxious to get the answers to many questions that are running through his mind, such as—is this a permanent job or just a fill-in? what is the pay rate? what are the working hours? how many people does the company employ? how long have some of the employees been with the company? is the company sound financially? what types of equipment and facilities do they have? how long has the company been in business? their pay schedule—weekly, semi-monthly, or monthly? is it a union shop? is the Service Manager always pleasant as during the interview? These questions and more will undoubtedly be on the mind of the applicant and must be answered.

While an interview can, in many respects, be considered as a two-way selling job, it is important that the interviewer not oversell the applicant on the advantages of working for his company to the extent the applicant will say almost anything to be accepted. The main reason for an interview is to get the facts about the applicant. Let him talk. When interviewing a prospective service employee a Service Manager should not be too optimistic about finding a man who meets all of the job requirements. Very often a young man who lacks experience can, with proper training, become a top-notch mechanic. It is highly desirable that the Service Manager seek qualifications in the applicant beyond that expected of a mechanic. Industry is always trying to hire a potential executive. Why shouldn't the Service Manager try to hire at least a potential Field Serviceman or Shop Foreman?

The Application Form:—This form, or questionnaire, is a written record of a man's history. During the interview, the applicant makes statements

on which the Service Manager bases his decision to hire him. But this is only conversation. The application form provides for a written record of the applicant's employment, his education, background, references, and facts that were not discussed during the interview. In addition to the standard questions on most application forms, such as name, age, Social Security number, etc., a well planned questionnaire will serve to analyze the man's objectives, anticipated salary, education, specialized training, military experience or draft status, hobbies, etc. By keeping such an application form on file, a Service Manager has an excellent source of information for future employee advancements.

Investigating an Applicant:—A very important phase of hiring. Unfortunately, this is not always done and may be the cause for personnel turnover. Perhaps, during rush periods an applicant may be hired for immediate employment without investigation. However, as soon as it is possible, the newly hired man should complete an application form and be investigated as thoroughly as if he had not yet reported for work. Why should a thorough investigation be made? It is not good business to train a man and then find out that he cannot do the work as both his and the company's time have been wasted. It is also a direct cost in time lost on the actual job, and possibly in parts scrapped because of poor workmanship. The worst features may be increased do-over jobs, field failures, and, for the retail service operation, customer down-time and dissatisfaction.

Hiring a Man:—Two important factors often overlooked at the time of hiring new personnel are defining the applicant's responsibilities to the company and the company's responsibilities to him. Quite often the usual procedure is for the Service Manager to say, "Alright, start to work Monday at 8:00 A.M." This is not enough. There must be an understanding of what the company will do for him and what is expected of him in the way of punctuality, good attendance, care of tools and equipment, cleanliness in appearance, and honesty. For the retail organization, fair and honest treat-

ment of the customer should be stressed. As it pertains to what the company will do for the man, the stability of the organization should be emphasized, pay schedule, opportunities for advancement, overtime pay, vacations, group insurance, health and hospital plans, and other features offered to employees.

Introducing a New Man to the Job:—The last step in placing a new man is introducing him to the company organization. This not only will make him feel at ease in his new surroundings, but will also help him get acquainted with the personnel with whom he will be working and the equipment he will be using. This introduction must be extended to management, including his Foreman. During this indoctrination to the organization, the available facilities for quality workmanship can be stressed as well as methods for handling work orders, obtaining parts, recording time spent on the job, and other shop procedures. This introduction to the job and the organization will play an important part in building an aggressive team.

Mobile Diesel Training Center

A Cummins Mobile Diesel Training Center is now providing instruction to Cummins dealer per-



sonnel and customers throughout Scotland, England and Wales. A complete program of instruction is offered in the maintenance, operation and repair of Cummins Diesel Engines. The unit carries a cutaway engine, plus cutaways of the Cummins PT fuel pump, fuel injectors, turbocharger, air cleaners, fuel and lubricating oil filters, cooling system and corrosion resistors. In addition, there are complete sets of service tools, audio-visual training aids, charts and diagrams and text and reference books. In charge of the Center is W. G. Charbonneau, who has more than 20 years experience in the diesel industry. The Center is headquartered out of Shotts, Lanarkshire, Scotland, where a Cummins plant is located.

Gauge Tests Efficiency of Air Filtering Systems

Hicklin GM Diesel has just announced an entirely new test device—the Maintenance Minder. This is a specially adapted gauge engineered to test the efficiency of air filtering systems on diesel engine applications. The new Maintenance Minder is a vacuum gauge, calibrated to measure from 0 to 60 in. of water, and is also sub-calibrated for various engine speeds. Accumulated dirt in air cleaners causes an increase in air restriction in the cleaning system. By measuring increased air flow restriction, the Maintenance Minder will easily determine the accumulated dirt in the air filtering system. The Maintenance Minder is designed to attach quickly to your engine, usually without any tools. The



gauge has a length of flex and oil resistant Aero-

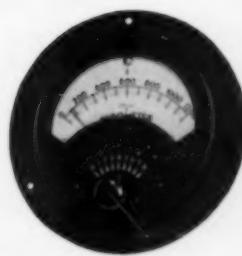
quip hose attached to a quick coupler that can be easily threaded into a tapped hole in the intake manifold. The quick coupler is brass with an integral Teflon ring to insure an air-tight seal between the gauge and the engine. With Maintenance Minder, periodic checks are easily made. Compactness and portability eliminate the need for a testing device for each engine.

Each unit comes ready to use, and in its own steel carrying case, designed for maximum protection of the gauge through years of service. The gauge itself is in a steel case fitted with a convex plastic lens to further protect the accuracy of the Maintenance Minder. For further information write direct to R. V. Hicklin, Hicklin GM Diesel, 5425 Second Ave., Des Moines, Ia.

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It's a simple fact: your power investment will pay more dividends when protected by an Alnor pyrometer system! At a fraction of the cost of your present maintenance bills, a rugged Alnor system gives you an accurate check of exhaust temperatures—warning in advance of cylinder overload...preignition...scaled jackets...clogged ports...detonation...faulty injection.

Alnor accuracy and dependability set the standard in the industry. More diesel and gas engines are delivered equipped with Alnor Pyrometers, because manufacturers as well as users know that Alnor protection means assurance of minimum fuel consumption per horsepower and elimination of most common cause breakdowns.

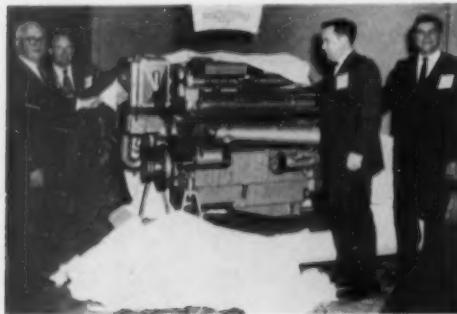
There's an Alnor Pyrometer and thermocouple assembly for every installation. Send for Bulletin 4361. Illinois Testing Laboratories, Inc., Room 508, 420 N. LaSalle St., Chicago 10, Ill.



PRECISION INSTRUMENTS
FOR EVERY INDUSTRY

GM 12V-71 Engine Shown in Houston

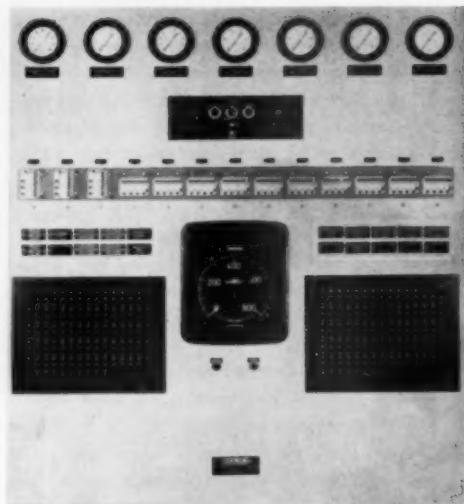
One of the new General Motors Detroit diesel engines recently announced is being shown for the first time in Houston. Here, the wrapping is taken



off the power unit by Ross Stewart, extreme left, chairman of the board of Stewart & Stevenson Services, Inc., Houston. Others are, left to right: Joe Manning, vice president and general manager of Stewart & Stevenson; Ed Bick, manager of sales promotion, General Motors Detroit Diesel, Detroit, Mich., and Eric Sutton, Regional Sales Manager, Detroit Diesel, Dallas. The diesel here is the 12 V series 71 Marine model for work boats, crew boats and pleasure craft. The new diesels are available in horsepower from 20 to 1650.

Alarm Scanner Automatically Monitors Multiple Points

Automatic scanning of several hundred process measurements at speeds up to 5 points per second and higher is provided by the new alarm scanner.



Central panel section of a typical Foxboro Alarm Scanner for 330 measurements of cooling water, cylinder head and lube oil temperatures and RPM at a pipeline compressor station. Temperature indicator in center is flanked by key switches for measurement of individual electrical input signals.

The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



Depots and Service Agents in over 100 countries

FUEL INJECTION EQUIPMENT DIVISION OF LUCAS ELECTRICAL SERVICES, INC.



FUEL INJECTION EQUIPMENT DIVISION OF

LUCAS ELECTRICAL SERVICES, INC.

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Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio

West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Branch Offices: 643 7th Street, San Francisco, California

4937 West Belmont Avenue, Chicago 41, Illinois

400 South Edgewood Avenue, Jacksonville, Florida

Canadian Distributors:

Joseph Lucas (Canada) Ltd. Head Office: 11 Davies Avenue, Toronto 8, Ontario

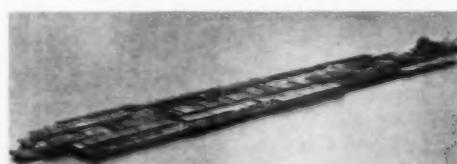
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec

engineered and manufactured by The Foxboro Co., Foxboro, Mass. The panel-mounted system is particularly applicable where warnings of critical high or low measurements are essential, such as in compressor stations, power plants, etc. In scanning a measurement point, the output voltage of a thermo-couple or other measuring element is compared with a reference voltage which has been preset on a pinboard to correspond to the high or low temperature for which a warning is desired. Should the resulting comparison voltage reflect an "alarm" condition, it will actuate the alarm unit to give visible and audible warning to the operator. An alarm printer, giving time and point number, is optional. Features of the system include: an auto-manual switch for manual or automatic scanning; manual switching to a precision indicator or recorder; variable scan rate; alarm setting repeatability to ± 0.05 millivolts; and automatic reset of alarm light when audible alarm is acknowledged and measurement returns to normal. Details of scanner operation and system components are contained in new Systems Engineering Data Sheet, B.1.1, available from The Foxboro Co., Foxboro, Mass.

ITS NEW

United States Tows 30,661 Tons

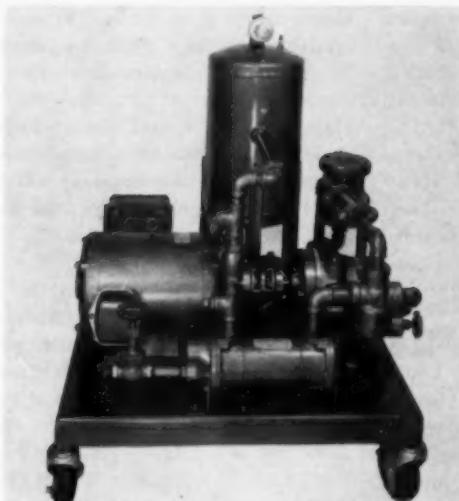
Federal Barge Line's *United States*, the world's most powerful river towboat, is shown north of



Chester, Ill., bound up the Mississippi River recently to St. Louis with a tow of 42 barges to set a record for the Upper Mississippi River. The *United States* was built by St. Louis Shipbuilding & Steel Company and is powered by four Cooper-Bessemer diesel engines developing a total of 8500 hp. The huge tow was approximately seven and one-half acres in area and carried 30,661 tons of general cargo.

Mobile Cooling Unit

Young Radiator Co. has announced the development of specially designed mobile cooling units. The units were originally designed for a leading manufacturer in the field of guided missiles, but have a much wider application. These units are used to control temperature and to circulate hydraulic oils or cooling fluids. For example, the capacity of the water cooled unit illustrated is 5,000 watts input (17,000 Btu/hr) and 10 gpm of oil



can be circulated against a maximum pressure at 250 psi. Units are available with either water cooled or air cooled heat exchangers. The cooling unit is completely equipped and can be furnished with pumps having special Teflon seals for extremely low viscosity fluids. For additional details on these products, write directly to the Young Radiator Co., Racine, Wis.

ITS NEW

Kettering Changes Positions at Electro-Motive Division



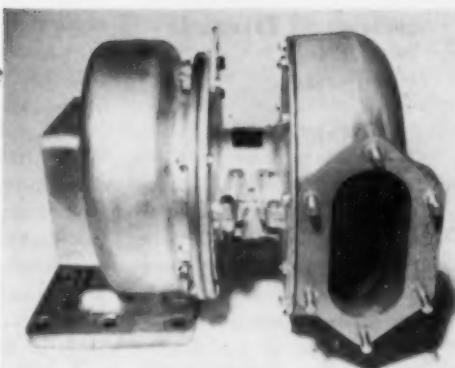
E. W. Kettering

Resignation of Eugene W. Kettering as research assistant to the general manager and his appointment as an engineering consultant of Electro-Motive Division of General Motors at La Grange, Ill., is announced by N. C. DeZendorf, vice president of General Motors and general manager of Electro-Motive. The resignation and appointment were effective February 28. "The recent death of my father, C. F. Kettering, has made it necessary that I give full time to the many institutional and family responsibilities I now must carry, including such activities as the Sloan-Kettering Institute at New York, the Charles F. Kettering Foundation at Dayton, Ohio, the Kettering Family Foundation, Chicago, Ill., and the Winters National Bank of Dayton," said Kettering. "Because of the deep-seated interests growing out of my long service with Electro-Motive I am glad that I can retain the connection as a consultant." Mr. Kettering will make his headquarters at the Winters National Bank in Dayton.

Union Pacific to Turbocharge 25 Diesel Locomotives

Turbocharging activities of The Garrett Corpora-

tion's AiResearch Industrial Division have entered an important new field with the announcement of a contract to equip 25 Union Pacific Railroad diesel locomotive units with AiResearch turbochargers. Each of the locomotives will be equipped in retrofit application with four T3006-01 turbochargers. Delivery is to begin in May. Union Pacific's extensive testing of three prototype locomotive units in freight train service over the past three years substantiated the advantages of turbocharging. The turbocharged engines are rated at more than 2000 hp. They maintain this output at the highest operating altitudes of Union Pacific's track system. The 25 turbocharged units will be operating mainly in Union Pacific's high altitude regions where the advantages of turbocharging are most pronounced.



Four of these AiResearch model T3006-01 turbochargers will be installed in each of 25 Union Pacific Railroad diesel locomotives.

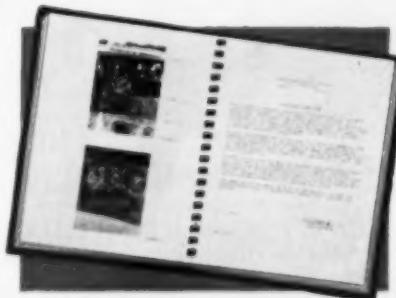


Are Your Engines Plagued by Failures Like This?

Eaton Engineers Can Help You Solve This Problem

The photographs above illustrate a typical fatigue-type failure caused by overstressing, in which fracture starts at the surface and, with repeated high stress, progresses to final break.

If you are an engine manufacturer and are having valve gear problems, Eaton engineers will be glad to consult with you and recommend procedures to help solve them. Or if you are designing new engines, perhaps our past valve experience can be valuable to you. Write, wire, or phone — there's no obligation.



Eaton Technical Reports are Available to Manufacturers

Eaton valve engineers will be glad to make a thorough study for you and furnish a complete technical report.

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VALVE DIVISION
MANUFACTURING COMPANY
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PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps
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Southwest Diesel

Notes

By Don Taylor

GIANTS in the contracting field, operating as the joint venture firm of Morrison-Kaiser-F&S are building the great Navajo Dam Project in the Four Corners area (where Colorado, New Mexico, Arizona and Utah come together). Recently Southwest Engine Co., Inc. of Albuquerque and Farmington, N. M. sold the firm four Lister air-cooled diesel generator sets, 10 kw each, and one 2 kw set.

BLACKJACK Uranium Mine owned by the Lance Corporation of Grants, N. M. has two new General Motors diesel-electric generator sets—200 kw each. Seller was Southwest Engine Co. Inc. of Albuquerque, N. M.

HOMESTAKE New Mexico Partners,

uranium mill, has repowered a Michigan 175A loader with a General Motors 4-71 unit. Southwest Engine Co. Inc. of Albuquerque, N. M. made the sale.

WESTERN Seafoods Co. of Freeport, Tex. has repowered the shrimp trawler, *Bryan Paul* with a 245 hp Cummins marine diesel engine, model NHRW-6-M. Cummins Sales & Service, Inc. of Palacios, Tex. made the sale.

DAMCO Blastholer sounds like a romping, stomping drilling rig, and it is! It is manufactured by Drilling Accessories & Mfg. Co. of Dallas, Tex. The unit drills shot holes for seismograph parties. Cummins Sales & Service, Inc. of Dallas sold the company a Cummins diesel engine J-4-P, 75 hp to power one of the rigs.

GENERAL MOTORS model 6028C diesel engine was purchased by Clyde Martin Lumber Co. of Cimarron, N. M. from Southwest Engine Co. Inc. of Al-

buquerque, N. M. for its portable sawmill.

COLE Painting Co. of Farmington, N. M. will be spraying paint about this booming area with an air compressor powered with a Lister model SL1. Southwest Engine Co. Inc. of Farmington, N. M. made the sale.

CARY Construction Co. of Stigler, Okla. repowered a 1201 Lima dragline with a 450 hp LRT-600 Cummins diesel engine. Cummins Sales & Service, Inc. of Oklahoma City made the delivery.

DOLESE Brothers Co. of Oklahoma City installed a Cummins 300 hp NHR-6-IP diesel in a model 80-D Northwest Shovel which was originally powered with a butane engine. Cummins Sales & Service, Inc. of Oklahoma City made the sale.

ON BAYOU BOEUF in South Louisiana not too far from the setting of Longfellow's "Evangeline", the J. Ray McDermott Co. has a yard that serves all sorts of purposes. Among other things it provides a repair site for the company's gigantic offshore cranes and drilling equipment. Cummins Sales & Service, Inc. of New Orleans recently delivered a 175 Cummins HR-6-IP diesel for installation on a Browning 35-ton steam crane.

N. M. took delivery on a General Motors diesel electric generator set rated at 100 kw and powered with a GM 4-71 engine. Southwest Engine Co. Inc. of Albuquerque and Farmington, N. M. made the sale.

J. RAY MC DERMOTT Co. took delivery on one HRS, 240 hp Cummins diesel and one 175 hp Cummins HR-6. These two engines were used in converting a large gantry crane, R30 American. Cummins Sales & Service, Inc. of New Orleans made these deliveries.

MAX SAND & Gravel Co. of Baton Rouge, La. repowered a 6 in. gravel dredge with a 335 hp Cummins NRTO diesel engine. Cummins Sales & Service, Inc. of New Orleans made the sale.

MORSE-ORY SAND & Gravel Co. of Amite, La. purchased a 320 hp Cummins NHRIS diesel engine from Cummins Sales & Service, Inc. of New Orleans. The engine repowered a 70-ton Plymouth locomotive.

EQUITABLE Equipment Co. of New Orleans took delivery from Cummins Sales & Service, Inc. on a 175 hp Cummins HR-6-IP diesel engine. This engine repowered an industrial Brown hoist steam crane.

New Fuel Oil Preheat Indicator

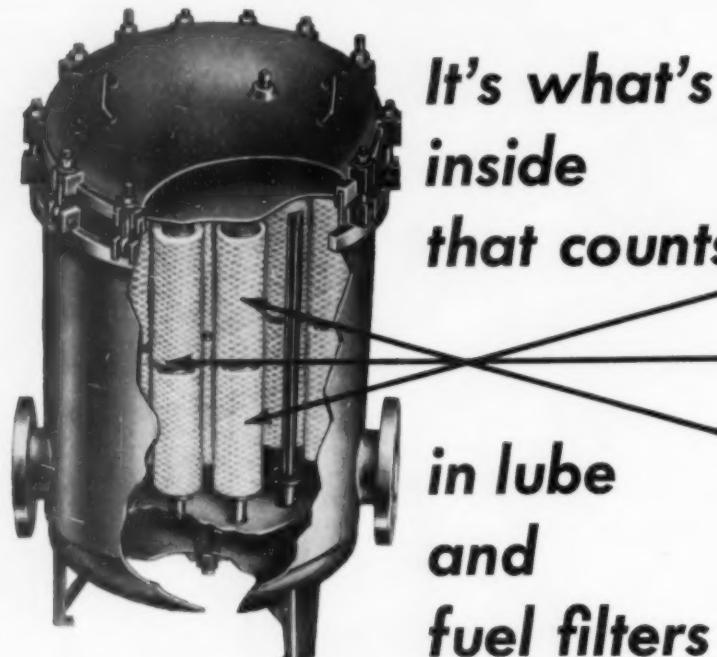
Bacharach Industrial Instrument Co. has introduced a Fuel Oil Preheat Indicator which directly indicates temperature to which No. 6 fuel oil must be preheated for best atomization viscosity. The instrument is easy to use, even by inexperienced personnel. No timing, calculating, or reference to charts is needed—the instrument's operation being entirely mechanical. It consists of a stainless steel cylinder as the container for the sample of the fuel oil to be tested, a steel scale rod having a piston at its lower end which is precision-fitted into the cylinder, and a "falling ball" timer comprising a ball sealed in a fluid-filled transparent tube. After pouring four ounces of fuel oil into the instrument's cylinder, its top cap is replaced with the scale rod pulled up to the zero mark.

TO LIBYA will go an International Harvester Co. oil field truck powered by a Cummins model NH-220-B, 220 hp diesel engine. The L. E. Whitlock Trucking Co. of Stafford, Kan. bought the engine from Cummins Sales & Service, Inc. of Wichita.

CHACO CANYON National Monument in New Mexico has a new 20 kw diesel electric generator set powered with a General Motors 2-71 engine. National Park Service made the purchase from Southwest Engine Co. Inc. of Albuquerque, N. M.

KENNECOTT Copper Corp. has repowered an Austin-Western Hydrocrane with a General Motors 4-71 diesel engine bought from Southwest Engine Co. Inc. of Albuquerque, N. M.

CAPITAL Lumber Co. of Cimarron,



Patented Honeycomb Filter Tubes, the heart of every Fulflo Filter, are your safeguard against excess engine wear and maintenance.

You get true *depth* filtration — through hundreds of filtering tunnels engineered for uniformity of size, shape and depth. You get the exact degree of micro-clarity you want — through positively controlled densities. You get *positive* protection — no bypassing, rupturing or channelling. Furthermore, you get unequalled tube life.

For true depth filtration, insist on Honeycomb Filter Tubes and Fulflo Filters. You can also rely on CFC elements and filters for by-pass filtration and for removal of soluble as well as solid contaminants.

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COMMERCIAL FILTERS CORPORATION

MELROSE 76, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEONARD, INDIANA

ing No. 6 fuel oil ranging from 70 to 215 SSF (Saybolt Seconds Furol) viscosity at 122° F. Other scales are used for other types of industrial burners. Use of the instrument is claimed to result in fuel savings, as well as in reducing soot, coking, and smoking since, with fuel oil preheated to proper atomizing temperature, clean firing and high combustion efficiency are assured. If the atomizing temperature is too low difficulties will be experienced in obtaining complete combustion, as evidenced by chimney smoke, dry soot in boiler flues and excessive carbon accumulation in fire boxes. Unnecessarily high atomizing temperature will adversely affect flame shape, fuel atomization and fire control leading to fuel waste, erratic firing and costly service attention. The indicator is made of stainless steel, is small in size, and is supplied in a fitted hardwood carrying case which measures 6 1/2 x 5 1/2 x 2 1/4 in. Complete particulars are given in leaflet 939 which is available by writing to Bacharach Industrial Instrument Co., 200 N. Bradock Ave., Pittsburgh 8, Pa. **ITS NEW**

Goodwin to New York Branch

Appointment of Hugh H. Goodwin, sales representative, has been announced by J. H. Newton, sales manager, White Diesel Engine Division, The White Motor Co., Springfield, Ohio. He will assist White Diesel's New York Branch Manager in expanded coverage of the New York area. With a background of 20 years of diesel engine industry experience, Goodwin will be at the service of consulting engineers, marine and stationary engine users, contracting firms and others in the New York area, where most of his sales experience has been gained. Mr. Goodwin began his engine industry experience with Superior engines in Springfield after early technical training. He then served in a sales capacity for several manufacturers within the engine industry before his recent return to the expanded Superior engine activity at White Diesel Engine Division. He is a member of the Society of Naval Architects and Marine Engineers, New York Chapter.

Cooper-Bessemer Appoints Spetka Manager Power Engine Sales

Promotion of Richard L. Spetka to the post of Manager, Power Engine Sales, is announced by Grant C. Woodard, General Sales Manager of The Cooper-Bessemer Corp. In this capacity, Spetka will head the Company's sales engineering program on 4-cycle engines for all stationary services such as power generation, as well as marine and other mobile services, Woodard points out. In taking on this new assignment, Spetka leaves

his position at Cooper-Bessemer's New York Domestic Office to fill the post formerly held by Frank L. Friedli. Mr. Friedli now heads the sales efforts of the Company's En-Tronics Controls Division. A graduate of Ohio State University, Spetka is a registered professional engineer and previously spent three years with the U. S. Army Corps of Engineers. He is now located at the Company's Mount Vernon, Ohio headquarters.

Enterprise Names New York Branch Manager

Mr. Austin B. Crouchley has been appointed branch manager of Enterprise Engine & Machinery Company, New York. Mr. Arthur W. Ostrander, vice president for sales of General Metals Corp. and general sales manager of the subsidiary Enterprise, San Francisco, announced the appointment.

With Enterprise since 1955, Crouchley was previously sales engineer for the New York area. A graduate of Tufts College in mechanical engineering, he held a commission in the U. S. Navy and did tours of duty in both World War II and the Korean conflict. Prior to joining Enterprise he was a sales engineer with the Chicago Pneumatic Tool Co.

Universal Right Angle Head for Speed Reducers and Gearmotors

Western Gear Corporation's Industrial Products Division announces availability of a universal-mounted right angle head adaptable for use on the company's Strait Line speed reducers and gearmotors. The right angle attachment can be furnished in horizontal, vertical or intermediate positions with single or double extended shafts. It features spiral bevel gearing precision cut from alloy steel forgings and case hardened for maximum strength and durability. Each set of gears is matched and lapped after hardening to insure precise contact and quiet operation. Conservatively selected bearings, husky output shaft and a wide bearing span provide ample overhung load capacity for chain, pinion and belt service. Other features include: 1. Dry-well construction to prevent oil leakage down the output shaft when the unit is vertically mounted. 2. A simple splash lubrication system, integral with the main housing, provides thorough positive lubrication of gears and bearings. Case design allows oil to be circulated freely at all times. 3. Less maintenance is required due to the fact that only two alemite fittings are required to lubricate bearings when the output shaft is in the vertical position. Large grease reservoirs are provided to insure positive lubrication. If further information about this attachment is desired, contact Marketing

Manager, Industrial Products Division, P. O. Box 126, Belmont, Calif.

ITS NEW

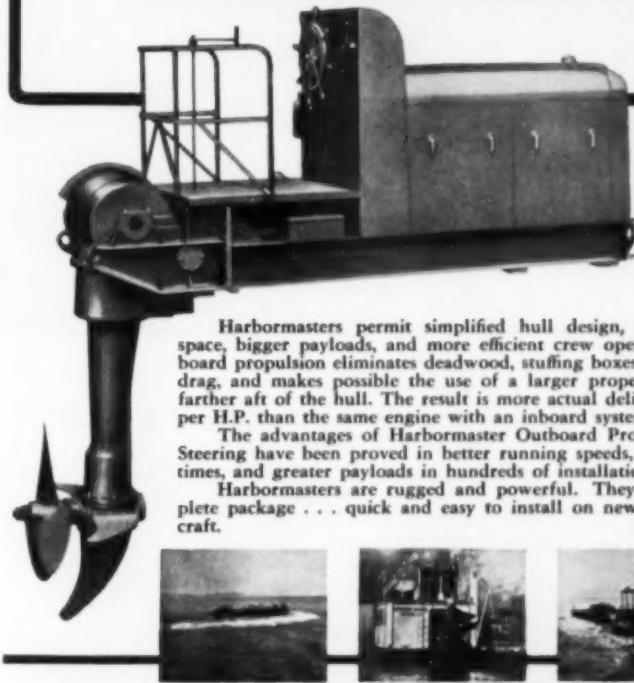
Egyptian Railways Orders 108 Locomotive Diesels

Receipt of an order for engines and electric transmission machinery to go into 108 General Motors-Henschel diesel locomotives ordered by the Egyptian Republic Railways was announced by N. C. Dezendorf, vice president of General Motors and general manager of Electro-Motive Division at La Grange, Ill. The propulsion machinery will be built at the La Grange plant of Electro-Motive and shipped to Henschel-Werke G.m.b.H., associate locomotive builder of General Motors at Kassel, West Germany, where the 108 locomotives will be constructed. The order for locomotives was obtained by Henschel from the Egyptian government, and the propulsion machinery order was placed with Electro-Motive by General Motors Over-

seas Operations Division, which has charge of marketing General Motors locomotive products outside the United States and Canada. The 108 locomotives will be added to the fleet of 32 General Motors locomotives and 15 General Motors-Henschel already operating on the Egyptian Republic Railways. The new order calls for seventy double-end streamliner type each with one twelve cylinder engine and two 2-axle, two motor trucks and thirty eight double-end streamliners each equipped with one sixteen cylinder engine and with two three axle, two motor trucks.

READY TO MAIL MAY 15!! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

Harbormaster Outboard Propulsion and Steering Units move bigger payloads in less time and at less cost

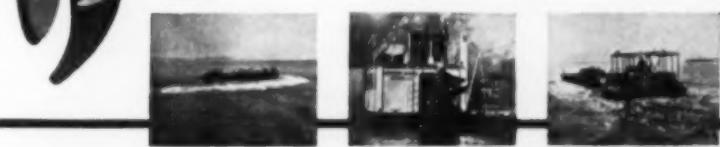


Models from 40 to 400 h.p., Gas or Diesel

Harbormasters permit simplified hull design, more cargo space, bigger payloads, and more efficient crew operation. Outboard propulsion eliminates deadwood, stuffing boxes and rudder drag, and makes possible the use of a larger propeller, located farther aft of the hull. The result is more actual delivered thrust per H.P. than the same engine with an inboard system.

The advantages of Harbormaster Outboard Propulsion and Steering have been proved in better running speeds, shorter trip times, and greater payloads in hundreds of installations.

Harbormasters are rugged and powerful. They are a complete package . . . quick and easy to install on new or existing craft.



Complete 360 degree maneuverability. Steer effectively in any direction with full power.

Special elevating mechanism allows one-man operator to raise entire submerged assembly.

Shear pin lets tell section ride up and over any submerged obstacle, protecting it from damage.

Send for catalog which illustrates and describes in detail all the advantages of Harbormaster Outboard Propulsion and Steering.

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Please send me New Catalog giving details and showing many photos of Harbormasters in action.

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Company.....

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New Service Training Center

Hercules Motors Corp. has opened a new service training center at its headquarters here and inaugurated a six-month series of regularly scheduled training courses for distributor and dealer personnel. Service and parts personnel of Hercules' distributors and dealers throughout the world have been invited

to participate in one or more of these sessions. E. L. Latta, director of service engineering, has announced. According to Latta, the new training program represents "another step in a broad program inaugurated by Hercules to assist its distributors and dealers in providing Hercules' engine users with the best in service and protection." The conference-type training courses will cover the

basic fundamentals of design, servicing and maintenance of all Hercules products. These include Hercules liquid-cooled and air-cooled diesel, gasoline and LPG (liquefied petroleum gas) engines and engines of Hall-Scott design. Messrs. R. H. Ball, V. F. Phillabaum and James Russell, Hercules sales and service engineers, will conduct the conferences, which will be limited to 12 men apiece. The new training center, fully equipped with a representative stock of engines, has been housed in a separate building adjacent to the main manufacturing plant.

Extensive Display By Detroit Diesel at Tulsa

In keeping with the addition of eight new basic engines to its product line this year, GM Diesel's exhibit at the International Petroleum show will feature a number of engines having their first showing to the petroleum industry. The new models introduced include four V-engines in the series 71 line and an entirely new group of engines in the lower horsepower range known as the 53 series. With the addition of these new engines to existing series 71 and 110 engines, GM Diesel has expanded its line to include two-cycle diesels ranging from 20 to 1650 hp in only three cylinder sizes.

Featured among new V-type models will be the first showing of the 24V-71 which has a maximum rating of 1008 bhp at 2300 rpm. The unit consists of two radiator-cooled 12V basic engines mounted side-by-side on a common base and driving a single output shaft. Both engines in the unit are provided with air clutches between the engine and the compound. Disconnect controls permit either engine to be quickly disengaged from the load, permitting alternate operation on light loads or during service. Compounding of the two engines in the 24V-71 is accomplished through a gear box designed to permit the desired counter-clockwise rotation of the output shaft at a reduced output shaft speed. It has an overall width of 72", length 108" and height 91". Other "V" models to be shown include the 6V-71 of 252 HP, the 334 HP 8V-71, the 504 HP 12V-71 and the 675 HP 16V-71 engine.

Another new model shown for the first time is a compact portable generator set designed to meet utility requirements for lights, electric motors, small hand tools, and other electric equipment used extensively on drilling locations. The newly developed set, mounted on a base and equipped with radiator and fan, consists of a two-cylinder model of the series 53 engine driving a brushless type generator (3 phase: .8 power factor; 60 cycle; 208/120 low voltage; 416/240 high

voltage.) Output of this unit covers a range from 15 to 24 kw. A side-mounted control panel fits within the unit's base-width and includes voltage regulator, meters and switches required for single or parallel operation. It is only 57" long and 37" high. Series 71 and 110 in-line engines are represented by twin engine models on display. Activated cutaway models showing the internal workings of the new 4-53 and 6V-71 as well as the 6-110 and turbocharged 4-71 will also be on display. Engine starting demonstrations utilizing the hydraulic starter will be included. GM Diesel's exhibit occupies approximately one-third of the 90 x 133 ft. permanent General Motors exhibition hall in which are also housed exhibits of Allison, GM Overseas, GMC Truck, Electro-motive, Chevrolet Truck and other Divisions of the Corporation. The GM Diesel exhibit is at the west end of this building.

New Fuel Selector Valve

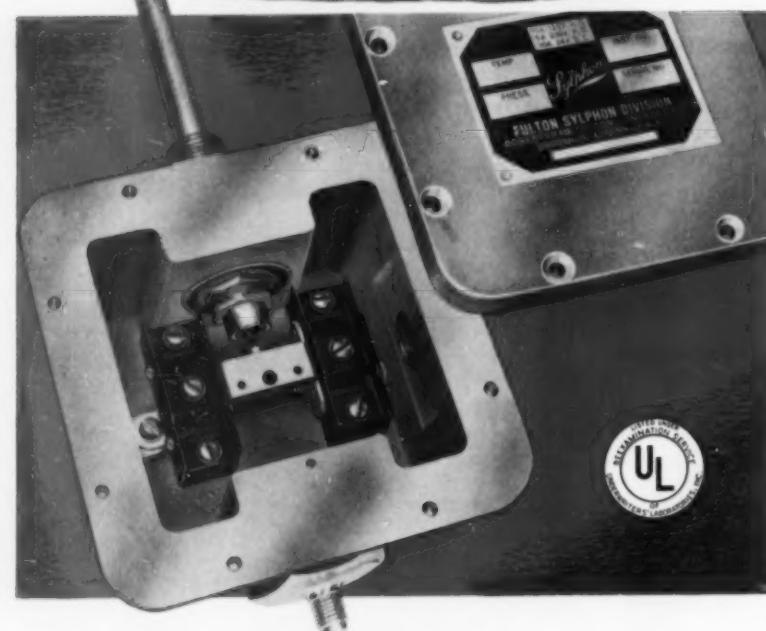
The new Products Corp., Skokie, Ill., has announced a new selector valve for use where two or more fuel tanks are a part of the equipment. This is a patented device (Pat. No. 2821972). This valve is designed for and meets paragraph D, section E on Fuel Systems in the Interstate Commerce Commission's Motor Carrier Safety Regulations and it is approved and in use by the military. It can be installed where convenience and good operation dictates and a dash control is provided so the operator can switch from one tank to another without taking his eyes off the road or moving from his customary driver's position. The full tank can be thrown into the line at any time. The valve is designed for the latest heavy-duty vehicles such as trucks and buses. It is compact, simple in design, easy to operate and it can be installed by anyone. It is fast acting and positive and it is unaffected by temperature. Its snap action makes it positive fully open or fully closed. The new valve can be put in and forgotten and needs no adjustment. It operates with any type of fuel pump and when transfer from one tank to another is made the empty tank is positively sealed off. There can be no leakage back to the empty tank from the full one. On larger trucks where three or four tanks may be used full control is provided by two selector valves.

ITS NEW

READY TO MAIL MAY 15!! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.



New Explosion-Proof Switch for Temperature or Pressure at a Sensible Price!



GIVES 4-WAY ACTION

Fully approved by Underwriters Laboratories for Class 1, Group D installations where atmospheres are hazardous, this new No. 542 switch gives you new safety . . . and new savings, too!

This new Fail-Safe switch responds to temperature or pressure and sounds alarm, flashes warning light, operates pilot or stops internal combustion engines if oil pressure drops to danger point or cooling water temperature is too high.

Available in a wide variety of switch ratings and contact arrangements, for either temperature or pressure, or combination. Any 20° adjustable temperature range from 130° F. to 245° F.; adjustable pressure range 5 to 25 psi; maximum pressure 75 psi.

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Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION • Knoxville 1, Tenn.

BREATHER-FILTER

protects housings, crankcases, storage tanks.



The Air-Maze breather-filter keeps dust out of engine and compressor crankcases, gearcases, hydraulic equipment, liquid storage tanks and machinery. Types and sizes available in both oil-wetted and oil bath models to protect every vented housing.

In the oil-wetted type, dust is impinged on a series of oil-wetted wire baffles. In the oil bath type, used where the dust concentration is unusually high, the filter media is enclosed in a bowl. Outside air must first pass through the oil, then the filter media, before entering crankcase or housing. Also functions as a backfire flame arrester.

Available in sizes from $\frac{1}{8}$ " to $3\frac{1}{2}$ ". Permanent, all-metal, easily cleanable. Write for booklet BC-453. Made by AIR-MAZE CORPORATION, Cleveland 28, Ohio.

DIESEL OPERATING
COSTS GOING UP IN

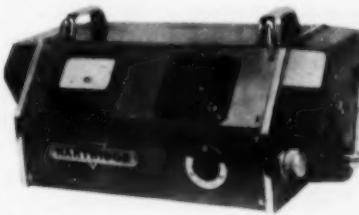
SMOKE?

Excessive smoking in Diesel equipment usually indicates faulty engine operation. However, it is difficult to accurately gauge exhaust smoke density by visual observation.

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- 2 models — AC or DC



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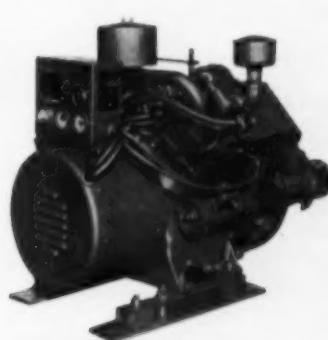
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to 100 KW.

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Florida Diesel News

By Ed Dennis

RECENTLY I made a tour from one end of the peninsula to the other and attended the launching of several vessels, saw several repowered craft and visited a half dozen or more utility plants among other calls. Several of these utility plants have or are contemplating new dieselized generating units as all are being faced with a heavy influx of people coming to the Sunshine State. Roads are being built as fast as the contracts can be let and business for the diesel engine distributors and accessory manufacturers in the State is on a steady upward trend.

THE *Gull*, a 30 ft. sportfishing vessel, owned by Malcolm Matheson of Coconut Grove, was recently repowered with an Allis Chalmers model 6-DAMR273 diesel engine rated 85 hp at 2800 rpm. It has 2:1 Capital manual r&r gears. It

replaced a 140 hp gasoline engine and gave the craft an increase in speed.

AUTO Marine Engineers of Miami, supplied the model DIX6 Hercules marine diesel engine rated 150 hp at 3000 rpm with Paragon r&r gears for the 20x8 ft. harbor working craft built at Riverside Boat Yard for an undisclosed buyer. It had Fram and CFC Fullo filters and strainers.

THREE General Motors powered, 62 ft. shrimp trawlers were delivered by Diesel Engine Sales of St. Augustine to Patterson Shrimp Co. of Texas. Christened the *Pat and Joe*, *Anita Marie* and the *Stephen M*, the trio have identical equipment which includes 6-71 G. M. diesels, 4.5:1 Allison r&r gears, 36x46 four blade Federal propellers and Goodrich rubber cutless stern bearings.

DOWN on Big Pine Key, Alonso Cathron, is using a TD24, a TD18 and a TD9. International crawler tractors with

dozer blades for land reclaiming work. These are powered with 161 hp, 105 hp and 66hp International diesel engines.

A MODEL 40-SX-6 Superior diesel engine rated 560 hp at 900 rpm connected to an Allis Chalmers 50 million gpd water pump will be installed in a City of Miami water pumping station within the next few months.

THE appointment of Richardson Tractor Co. for the Allis Chalmers' line of construction equipment has been announced. They will do service and sales work for Florida and southeastern Ga. Offices and shops have been established in Fort Lauderdale, Jacksonville and the Tampa areas. R. L. Richardson, president, has had over 25 years of experience in the construction and construction equipment fields.

TWO Fairbanks-Morse, model 32E14 diesel engines, each rated 300 hp at 300 rpm, supply the necessary power needed at the Navy water pumping station at Marathon. A similar make and model supplies power for the wells at Florida City.

IDEAL Crush Stone at Medley repowered three Michigan #175 front end loaders with Cummins J. S. 6 diesel engines. These are rated 160 hp at 2500 rpm, the same Clark torque converters were used. The diesels came from Cummins Diesel Engines of Florida.

FLORIDA Turnpike Authority received a Gradal machine for earth-moving maintenance work on the Sunshine State Turnpike. It is powered with a G. M. 3-71 diesel, Borg & Beck clutch and Commercial hydraulic pumps. The Turnpike, built only a couple of years ago, is doing so well, with its bonds three years ahead of its pay-off schedule, they are thinking of extending it to Orlando.

PAN AMERICAN Airways is having a Caterpillar D311 series H diesel with a 30 kw generator installed at their facilities in the new Miami International Airport; the set was engineered by Shelly Tractor & Equipment Co.

HOMESTEAD Municipal Light Plant had a very successful year, they were able to put \$112,500 into the city's general revenue fund, last year, after setting aside the regular cash reserve plus reducing the electric rates 20 per cent. The Fairbanks Morse generators have a capacity of about 10,875 kw.

TWO generating units are temporarily being used by the Florida Keys Co-op at Marathon to cope with the ever increasing demand for more electricity on the Keys. One is a General Motors 8-268-A diesel with a 375 kva Columbia 2400

volt generator and the other is a G. M. 12 567 diesel generating set; both have Young jacket water coolers.

ONAN model 3 M. D. S. P. three kw 110 volts diesel generating sets were installed by Ellis Diesel Sales & Service of Fort Lauderdale on the 55 ft. yacht *Barbara* of Fort Lauderdale, the 55 ft. *Drum* of Pensacola and the *Paddlewheel Queen*, a sight seeing vessel of West Palm Beach.

AT the Allied Marine yards, the 100x23 ft. twin screw *Joseph Conrad* of Miami, powered with General Motors 6-71 twins on each shaft and G. M. 5:1 hydraulic r&r gears, recently completed a 14,000 mile trip to Europe and the Mediterranean.

FOR the Thorington Construction Co., working on the New River tunnel at Fort Lauderdale, two #3900 Manitowoc cranes with 100 ft. booms, for steel pile driving, powered with Cummins model NHRS supercharged 250 hp diesels and Twin Disc torque converters.

UP near Arcadia, J. W. Conner & Son, Inc. road contractors, are currently using Allis Chalmers HD21 dozers (225 hp turbo AC diesel) and HD16 dozers (150 hp AC diesel) to push load their eight yard Le Tourneau-Westinghouse scrapers on road construction work.

CLEWISTON Motor Co., Caterpillar distributors at Clewiston, Hendry County, have opened a branch office on Okeechobee Road in West Palm Beach. Complete facilities for sales and service of the Caterpillar line of dieselized equipment will be taken care of here. Leonard Ellington is the manager.

FIVE model DIX4D Hercules 35/8x4 diesel engines power the Lincoln arc welding machines (1700 rpm 40 volt) mounted on two trucks for welding purposes by the Harbert Construction Co. on pipe line work.

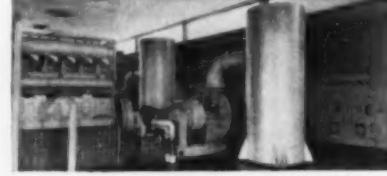
SAMPLE ROCK Co. of North Dade took delivery of a portable Cedarapids stone crusher powered by a UD18 International diesel rated 125 hp at 1600 rpm from Florida Georgia Tractor Co. of North Miami Beach.

Keystone Diesel Appointed Distributor

The Detroit Diesel Engine Division has named the Keystone Diesel Engine Co., Inc., of Wexford, Pa. as distributor of GM diesel engines in Western Pennsylvania. The distributor is a new company formed to handle GM diesel's complete line of automotive, industrial and marine models ranging from 20 to 1650 horsepower. The appointment is described as another important move by

MAXIM THE COMPLETE SOURCE OF SILENCERS

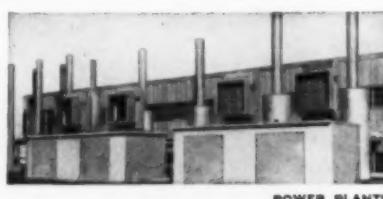
For over 50 years, Maxim's main concern has been to engineer the finest silencing equipment possible. Maxim's complete line of silencers makes it possible to select precisely the kind and degree of noise control you need. Put Maxim engineers to work on your special problems, or send for latest bulletins.



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GM diesel to achieve 100 per cent distribution of its products through purely "engine houses". President of the new company is Arthur E. Bosetti, former GM diesel regional manager. Other officers include Frank Chase Jr., vice president and sales manager, and Fred Demme, secretary-treasurer. The new company, located south of Wexford on US Highway 19, places sales and service facilities within easy reach of construction, trucking and other industrial diesel users of Pittsburgh. Modern servicing facilities include a dynamometer for engine testing, injector rebuilding, comparator and other equipment for complete engine overhaul. It has reserved space inside for engine servicing of large trucks.

White Diesel Expands Southeast Representation

Mr. James A. Robbins, sales engineer, will be serving an expanded Southeast territory for White Diesel Engine Division, it was announced recently. Vice-President and General Manager W. F. Burrows stated that Robbins appointment extended direct factory representation to all of Florida, Georgia and the Carolinas for White Diesel Engine Division, The White Motor Co. Mr. Robbins has represented White's Superior and Atlas engines in parts of the South-

east for the past two years, serving marine and stationary engine owners. His experience in marine sales and mechanical engineering capacities is available to Superior and Atlas engine owners, consulting engineers and equipment buyers. Mr. Robbins is a graduate of Case Institute of Cleveland with a B. S. in Mechanical Engineering, and is headquartered at Clearwater, Fla.

Cummins to Exhibit 11 Engines at Tulsa Show

Cummins Engine Co., Inc. will exhibit 11 Diesel Engines at the 1959 International Petroleum Exposition. The Cummins exhibit will be located in Block E, East Area of the International Petroleum Exposition grounds in Tulsa. It will feature various "V" symbols representing Cummins' high horsepower V line of Diesel Engines. The engines to be displayed include both cutaway and production models. A number of Cummins executives, headed by C. R. Boll, vice president-sales, will represent Cummins at the International Petroleum Exposition. Mr. J. D. Gatten is in charge of the exhibit.

New Bulletin Issued by GM on All Purpose Power Line

A 12-page illustrated brochure describ-

ing the wide selection of industrial and automotive engines now available in GM's new All-Purpose Power Line has just been released by Detroit Diesel Engine Division. Under the heading, "Choose the Power for your Purpose," the booklet gives power ratings and overall dimensions on over 100 in-line, "V" and turbopower engine models. It includes fan-to-flywheel and base-mounted power units to power or re-power practically any type of industrial, construction, petroleum or agricultural equipment. Truck engines listed include the popular "E" models and the new "V" and in-line units introduced in January. The GM All-Purpose Power Line consists of single, multiple and turbopowered units ranging from 20 to 1650 hp in only three cylinder sizes. Four new series 53 engines which set a new high for efficient compact and light weight power in the 20 to 195 hp range are covered. Copies of the brochure may be obtained by contacting GM diesel distributors and dealers or by writing De-

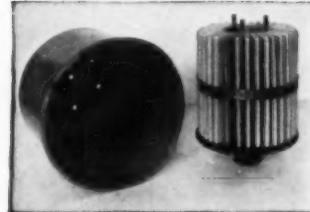
troit Diesel Engine Division, General Motor Corp., Detroit 28, Mich.

ITS NEW

Manufacturers Agency Formed

A new Detroit manufacturers agency, Air Systems, Inc., has been formed by a merger of three Detroit firms. The new organization will market American Air Filter Company's air filter, dust control, heating & ventilating, air conditioning, and engine & compressor products, as well as its Illinois Engineering specialties. All employees of Saunders & Co., Earl W. Graham and American Air Filter's Detroit Branch Office will make up the personnel of Air Systems. Mr. A. Saunders has been named president of the new firm; Charles Trambauer, vice president; Earl W. Graham, vice president and secretary; and Ken Wagoner, vice president and treasurer. Mr. Wagoner formerly was associated with the Trane Company in Detroit. Air Systems, Inc., will be located at 18263 North McNichols Road, Detroit.

NEW DRY TYPE AIR FILTERS for engines, compressors, blowers and other industrial applications



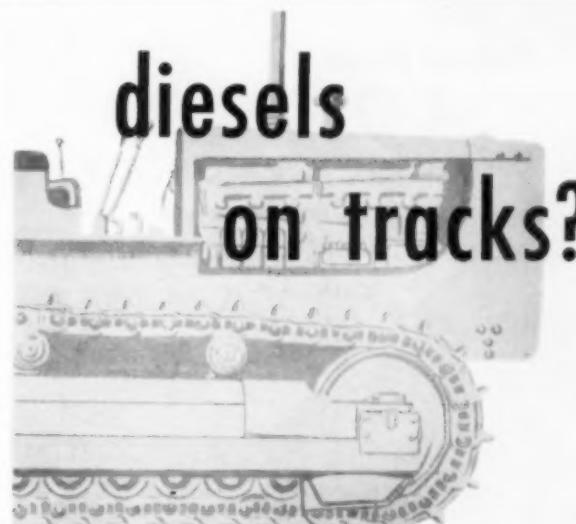
period to another and, 4.) the dirt concentration is relatively low, except when vibration is present to help dirt removal.

The Air-Maze Dry Filter is one of the most efficient mechanical type filters available. Laboratory tests indicate better than 98% efficiency with particles of 2 micron mean diameter and practically 100% efficiency with particles of 5 microns or larger.

The Air-Maze Dry Filter type DA employs a special highgrade felt filtering media arranged in deep pleats to provide extended area, and armored on both sides by heavy galvanized cloth. Heavy gauge perforated tubing inside the media and a metal strap on the outside form a rigid unit of great strength and are corrosion protected. Made in sizes from 20 cfm to 6650 cfm. Catalog DA-1056 available. Write AIR-MAZE CORPORATION, Cleveland 28, Ohio.

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Quincy
COMPRESSORS

Inland River Reports

By A. D. Burroughs

SCHEDULED for Louisville harbor work is the *Joe Taylor II*, new all-steel towboat completed by Greenville Manufacturing Co. Owned by Volunteer Towing Service, power is provided by two Caterpillar engines rated at 280 hp each.

FAST-growing fleet of the Mississippi Lime Co., Alton, Ill., gains a new 46 x 15 ft. new towboat, *Mississippi III*. Western Machinery and Engine Co., St. Louis, supplied a pair of GM Detroit Model 6-71 engines, each rated at 170 hp at 1800 rpm.

SEEING service for Delta Towing Co., is a solid performer, the new twin-screw towboat, *Connie Jane*. The 55 x 18 ft. craft has a rated 500 hp supplied from two GM engines.

WITH the pickup in spring pushing,

numerous older towboats are holding their own with the newest crafts. The popular *Peace*, built in 1934 by Dravo, was in action for UBL with 1500 hp from GM engines.

OUT on the Ohio was the *Anker L. Christy* using 1200 hp supplied by Cooper-Bessemer engines to turn in fine performance. Built in 1941 by Sturgeon Bay Shipbuilding and Dry Dock, this 108 ft. towboat is a regular in the gasoline trade.

THE *Paul Blazer*, another 18-year-old power package built in 1941 by Calumet for Ashland Oil & Refining Co., continues to make fine performance records with power provided by Superior engines rated at 2000 hp.

THE *Martee*, in action on the Illinois waterways, is another example of diesel durability. Built in 1939, the 20-year-old performer was completed by Sturgeon Bay as the *Tadpole*. A rated 300

hp is reportedly supplied by Allis-Chalmers engines.

SPOTTED another old favorite in the Cairo area, the *Wm. Penn*. Equipped with Superior engines, the 1600 hp UBL towboat was completed by Dravo in 1940.

THE 86 ft. towboat, *Beaver*, originally initiated in service in 1937 by Dravo is performing with new power from a new 450 hp Fairbanks-Morse engine, installed recently at Marietta Manufacturing Co. plant.

REGULAR for the coal trade on the Ohio, *Mike Creditor* was turning in a neat performance for the Ohio River Co. with power from Baldwin-Lima-Hamilton engines. The twin-screw towboat was completed in 1955 by St. Louis Shipbuilding and Steel Co.

NORDBERG supairthermal engines provide ample push power for the busy *George W. Lenzie* handling the increasing seasonal traffic on the upper Mississippi, for Material Service Corp.

IN the same area we saw the faithful *Sandra Marie*, a three-year-old towboat, using its 700 hp developed from a Kahlenberg model E engine for owner S & S Marine Towing Co., Joliet, Ill.

ONE of the more powerful Illinois Waterway towboats, the *Hamilton*, was in action, too, with good time resulting from power supplied by two Enterprise engines. The 2560 hp craft, completed two years ago at St. Louis Ship, serves Suffolk Marine Corp.

MEMPHIS firm, Frankie and Johnnie's Boat Store, adds a neat new grocery boat, the 40 x 12 ft. *Ruby G*. Constructed by Barbour Metal Boat Works, St. Louis, the craft has 165 hp developed by GM Detroit 6-71 engine.

Onan Generators Described

The complete line of separate electric generators manufactured by D. W. Onan & Sons Inc., is described and illustrated in a new 4-page folder recently issued by the Minneapolis firm. These heavy-duty generators are built to provide electric power for fishing fleets and work boats, large and small pleasure craft, draglines and shovels on construction sites, magnet cranes for industry and as emergency standby units on farms, dairies and greenhouses. Three types of Onan generators are described: alternating current models, 1,500 to 10,000 watts; battery charging models, 1,500 to 5,000 watts; and tractor-drive models, 4,000, 7,000 and 12,000 watt sizes. Precise specifications of the various controls, (ac switchboards, rheostats, wall

mount switchboards and manual transfers) to operate each type of generator are described and illustrated. Copies of this easy-to-read, 6 1/2 x 9 in. folder are available at no charge from the manufacturer. Write D. W. Onan & Sons Inc., Minneapolis 14, Minn., requesting Folder F-141.

ITS NEW

Oilfield Trucker Upgrades Fleet

L. C. Jones Trucking Co., Inc., one of the oldest oil field truckers in the nation, recently has purchased ten International model RDF-405 extra heavy-duty truck tractors as part of a fleet replacement program. The 227 in. wheelbase Internationals, rated at 76,800 lbs. gross combination weight, are being used for long haul oil field machinery moves. They operate from the company's New Town, N. D., Pueblo, Colo., and Oklahoma City terminals. Each is equipped with a Cummins NH-220 diesel engine, Fuller five-speed overdrive transmission, Spicer four-speed auxiliary transmission and Spicer double-reduction rear axle. After delivery of machinery to a well site, according to the company's president, L. C. Jones, the RDF-405's also can be used to set up complete drilling rigs, thus eliminating the need for rig-up trucks. A 43-year-old concern, Jones Trucking moves all types of pipe and heavy machinery as well as oil field equipment in 20 states, from North Dakota to Texas and from Pennsylvania to Utah, plus Canada. Its predominantly International fleet of 116 units travels five to six million miles annually. Gross revenue of Jones Trucking last year was approximately \$1.5 billion.

Airborne Turbine Generator Sets Ordered

Solar Aircraft Co. has announced a new Air Force contract to build gas turbine-powered airborne generator sets for the KC-135 jet tanker. The \$1,771,000 order calls for delivery of Mars gas turbine power units, spare engines and parts, according to France Q. Wilson, manager, turbine sales. The new contract follows a \$3,000,000 order for the generator sets placed last year. The Boeing-built KC-135, used by the Strategic Air Command, is the fifth major aircraft now using Mars-powered airborne generators. The others are the Boeing KC-97 tanker, the Douglas C-124C Globemaster, the Lockheed C-121C Super Constellation and the Convair C-131B flying electronic test bed. The generators are used to provide extra electrical power during takeoff and landing and to operate a variety of electrical mechanisms, both in flight and on the ground when the main engines of the aircraft are off. Supplied with heat exchangers, the units, utilizing exhaust heat, also are used for cabin heating.

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DIESEL ENGINES
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VERTICALLY driven
ROOSA MASTER
fuel injection pumps

The vertical pump drive arrangement, pioneered by Hartford Machine Screw Company, is a revolutionary and exclusive ROOSA MASTER feature. The vertical adaptability has saved manufacturers thousands of tooling expense dollars by permitting standardization of engine blocks for gasoline and diesel engines.

More than 40,000 vertically driven ROOSA MASTER pumps in satisfactory field service are proving that the vertical application to existing and new engine designs is practical and sound.

VERTICAL DRIVE ADVANTAGES: • Simplicity of installation • Easy accessibility • Shorter injection lines for better performance • Lower cost • Makes available space for other accessories.

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Two Representatives Named By Lonergan Co.

The J. E. Lonergan Co., manufacturer of safety and relief valves and industrial gauges, has named Agren-Ascher Co., 5-121 General Motors Building, Detroit, as Detroit area representatives. Territory includes all of Michigan except the upper peninsula, northwestern Ohio including the Toledo trading area, as well as Metropolitan Detroit. Also named was the R. C. Bechert Co., 110 E. 42nd Street, New York City, as New York area representatives. Their territory includes Northern New Jersey and Metropolitan New York. Announcement of the new appointment was made in Philadelphia by Mr. Edward T. Nahill, Lonergan sales manager.

Technical Phases of Onan Products Explained

A new series of educational pamphlets covering complicated electrical and technical characteristics of engine driven generating equipment has recently been published by D. W. Onan & Sons Inc., Minneapolis, Minnesota. Titled, "Onan Power Talks . . . from the Sales Department," the colorful pocket-sized bulletins deal with the various technical phases of Onan Products, (electric generating plants, air-cooled engines, separate generators) their operation and their use. Although written in easy-to-understand language, the series retains the technical points necessary to understand and converse in these often-misunderstood areas. Well illustrated, the pamphlets should be of considerable help to both the initiate and the expert in the various technical fields which are covered by these bulletins. "Power Talks" are available free of charge from the manufacturer, D. W. Onan & Sons Inc., Minneapolis 14, Minn.

Cat Air Cleaner Reference Sheet

Dry-type air cleaner change-over groups for Caterpillar D8 tractors bearing 13A, 14A and 15A serial numbers, D9 Tractors, No. 583 pipelayers, and DW20 and DW21 tractors having series F (one air

cleaner) and series H (two air cleaner) engines are now available, Caterpillar Tractor Co. has announced. Change-over group numbers for the machines are enumerated by serial number classification, along with element service group numbers in a new two-page parts reference. The Parts Reference sheet may be obtained from Caterpillar dealers or by writing to the Advertising Division, Caterpillar Tractor Co., Peoria, Ill., and requesting form No. 33334.

ITS NEW

New Filter Facts Folder

A new illustrated folder that explains little-known filtration facts is being offered by Engine Life Products. Entitled, "Elementary my Dear Watson," the new literature leads off with a interview in which oil filtration is discussed. In the course of the interview, the technical explanation of the filter condition commonly called "hour-glassing" is covered. In addition there are sections in the folder devoted to a treatment of "Conditions that cause filter elements to shrink in diameter --" and "What to do about it . . ." The new folder will be sent free, on request. Address: Engine Life Products Corp., 115 South Granada Avenue, El Monte, Calif.

ITS NEW

Flexible Metal Hose for Diesel Installations

Helpful data on best ways to overcome flexation and vibration problems of diesel pipeline connections are contained in the new Allflex Flexible Metal Hose Data Sheet #552 just issued by Allied Metal Hose Co. Distilled from years of specialized experience, the charts and diagrams give clear, easy-to-read recommendations for engine exhaust, air intake and oil lines that require flexible, leakproof connections to compensate for vibration, expansion, offset, misalignment and other problems. Many typical installations are helpfully diagrammed. Some of these are 90° permanent bends (all hose or with elbows), lateral and vertical offset, expansion and contraction. The convenient check list enumerates important size and application in-

formation. Copies of the 10-X-552 Diesel Data Sheet are available from the Allied Metal Hose Co., 3753 Ninth St., Long Island City 1, N.Y.

ITS NEW

Brochure Describes Diesels for Highway Trucks

An eight-page illustrated brochure, entitled, New GM Diesel Power for Highway Trucks, has just been released by Detroit Diesel Engine Division. The booklet fully describes four new engines including three V-type diesels. Combined with GM's series "71E" engines the new models complete an All-Purpose Power Line of "V" and "inline" engines adaptable for any size and style of truck from 20,000 to 75,000 GCW and up. V-models covered include the 6V-53 of 195 hp, the 6V-71 of 217 hp and the 8V-71 of 290 hp. An inline model of 130 hp, designated as the 4-53, completes the additions. Copies of the brochure may be obtained by contacting GM diesel distributors and dealers or by writing Detroit Diesel Engine Division, General Motors Corp., Detroit 28, Mich.

ITS NEW

Fuel Oil Heaters Described

A new eight-page bulletin gives complete specifications and description of Brown Fintube fuel oil heaters used on the suction side of pumps for heating extremely viscous fluids, such as Bunker C fuel oils, asphalt, etc., in order to reduce their viscosities so that they can be more readily pumped. The two principal types catalogued include (1) the tank suction type heater which is installed on the tank with the open end of the heater extending into the tank, and (2) the line type heater which is mounted entirely outside the tank in the pipeline. Information given covers data on the Fintubes, tubesheet data, materials and code, pressure and temperature ratings, heater lengths, shell nozzle orientation and nozzle sizes. Dimensional data on the standard 15 sizes of both line and tank type heaters are presented. For a copy write for Bulletin No. 585, Brown Fintube Co., 502 Huron St., Elyria, Ohio.

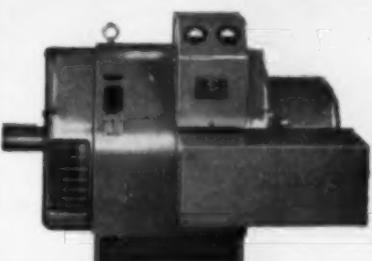
ITS NEW

READY TO MAIL MAY 15!! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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"PACKAGED" GENERATOR**

AMP-PAK



AMP-PAK Generator shown is rated at 187 kva, 1200 rpm, 240/480 volts. AMP-PAK is available in ratings of 75 thru 187 kva at 1800 rpm and 62½ thru 187 kva at 1200 rpm. Three phase, 80% PF, 60 cycles, 50C rise, and 120/208, 240 and 480 volts.

No exciter... No moving parts in the voltage regulator

AMP-PAK is a compact, revolving field a-c generator with built-in, static excitation system; static voltage regulator; and basic metering and controls conveniently grouped. AMP-PAK is a portable unit, factory assembled, internally connected and tested.

No rotating exciter to maintain. D-C excitation is provided by a heavy duty, long-life, static rectifier.

No tubes, relays, vibrators to service. Voltage is regulated by a static, E-M-developed sensing circuit and "magical" magnetic amplifiers.

Holds voltage "rock-steady" so your motors, lights, and electronic equipment will work better. The static regulator provides ±2% regulation.

Starts big motors. A special, built-in voltage booster transformer stands by to reinforce line voltage when heavy loads are suddenly applied.

Easy to install. Needs no switchboard. Just connect load to AMP-PAK thru a suitable line switch.

Simple to operate. Has no belts, no "tricky" commutator, no adjustments — anyone can operate AMP-PAK.

See your nearest E-M Sales Engineer and write the factory for publication PRD-236.



ELECTRIC MACHINERY MFG. COMPANY
Minneapolis 13, Minnesota

Largest manufacturer of "Packaged" Generators

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KEEP YOUR ENGINES RUNNING CLEAN AND LONGER

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IN CANADA - UPTON-BRAEDEEN-JAMES, LTD. - 890 YONGE ST., TORONTO - 8760 VERVILLE ST., MONTREAL

Commercial Filters Elects Welling Vice President



Frank W. Welling

Commercial Filters Corp., Melrose, Mass., has elected Frank W. Welling vice president of the company. He will have broad responsibility for the administration of the company and sales of its products which include a wide variety of industrial filtration equipment. For the past four

and one-half years, Welling has served as Vice President and Director of W. A. Case & Son Manufacturing Corp., Buffalo, N.Y. He previously served in a similar capacity with Univis Lens Co., Dayton, Ohio, and was also associated with Booz, Allen & Hamilton, Management Consultants, in New York and Chicago. He is a graduate of Northwestern University where he received his degree in Business Administration. Mr. Welling is a member of the Controllers Institute of America and the National Association of Accountants.

Merchant Prince Enters Service

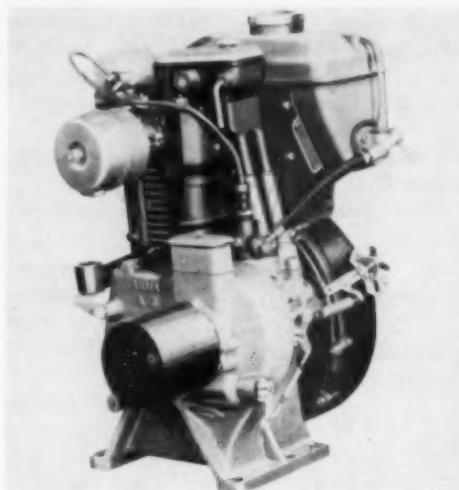
The third 3200 hp towboat built by Dravo Corp. entered the service of Western Rivers Navigation Co. of Pittsburgh early in February. An affiliate of Continental Ore Inc., of New York, Western Rivers Navigation operates as a contract carrier with one of its chief activities, transportation of ore. The newly organized barge line's officers are: E. D. Osbourne, president, David T. Sheehy, vice

president, and Francis X. Wiget, secretary.

The new towboat was christened the *Merchant Prince* in ceremonies at Pittsburgh's Allegheny River wharf on Jan. 29. She is 148 ft. long, 34 ft. wide and 10½ ft. deep and is powered by two General Motors Cleveland diesel engines, each delivering 1600 shp. Scientific design of the Dravo-3200's hull, rudders and Kort nozzles enables the vessel to push at least 20 loaded barges at speeds in excess of 6 mph and smaller tows at proportionately higher speeds. Design features, developed as the result of model basin tests conducted by Dravo in the Netherlands, make possible the boat's use for either maximum size heavy tonnage tows or streamlined high speed tows. Superstructure of the welded steel towboat includes a main deckhouse, upper deckhouse and pilothouse. The all-electric galley, messroom, lounge and quarters for the crew are located in the main deckhouse. Quarters and lounge for officers and guests are located in the upper deckhouse. The pilothouse contains all operating controls, including such modern

navigation aids as radar and ship-to-shore telephone. The six streamlined rudders are operated by a hydraulic steering system, with Dravo's differential steering linkage for the four flanking rudders giving the craft added maneuverability.

Yanmar Markets Small Diesel



Yanmar Diesel Engine Co., Osaka, Japan announces a new model A2, which develops from 2.3.5 hp at 2600-3000 rpm, and is designed for use with small-size farming and construction machinery and generators as well as in the field of marine propulsion. The new Yanmar engine is air cooled and operates on the four-stroke-cycle. It is hand started.

ITS NEW

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ANYTIME-Tells You Exactly When It Needs Servicing

NOW — for the first time, an efficient, compact, EASY TO USE testing gauge is available to tell you exactly when to service your air cleaner. With only a quick, finger-tight attachment of the Maintenance Minder to the engine intake, YOU CAN READ THE CONDITION OF YOUR FILTERS! A "must" for regular, practical maintenance in stationary, construction, quarry and other installations where dust is a problem. For further details write

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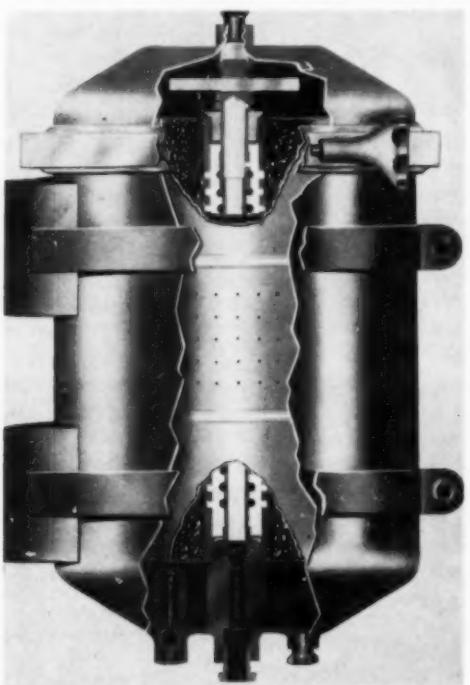
Power for Refinery Welding in Columbia



In the broiling sun at Mamonal, 9 miles south of Cartagena, Columbia, these Caterpillar diesel-electric sets furnished power for a battery of Lincoln Electric welding generators on a refinery construction job being handled by Compania Bechtel, Cartagena. Seven similar stationary sets supplied power to welding generators on other phases of the construction which involves a 26,000 bbl. refinery for International Petroleum (Colombian) Ltd. Work proceeded from its start on a schedule of 54 hours weekly, with 1100 native Colombians on the job, plus 400 more on subcontracts and 100 North Americans on the supervisory staff.

Heavy Duty Oil Filters

Two new oil filter designs for heavy duty diesel applications like trucking, marine and construction equipment, etc. have been announced by W. G. B. Oil Clarifier, Inc., Kingston, N.Y. These new bypass type filters are available in two models—the WB-1 with a capacity of 500 cu. in. and the WB-2 with a capacity of 750 cu. in. Both filters can be converted to a larger or smaller size by the exchange of a few parts and employ replacement



cartridges that can be changed without tools. Further details can be obtained by writing the manufacturer.

ITS NEW

New American Bosch Office and Warehouse Facility

Construction has started on a new 16,000 sq. ft. building on Enterprise Avenue in Cleveland, Ohio,

which will house the new regional branch office and warehouse of American Bosch Arma Corporation, Springfield, Mass. Scheduled to be completed by July 1st, this modern branch facility will be completely equipped to handle both sales and service of American Bosch products throughout the Ohio area. It forms a part of the firm's recently instituted program of establishing regional marketing areas throughout the United States, coupled with regional warehouse facilities for redistribution to American Bosch sales and service agencies and, in part, to manufacturer customers. The new branch office will be under the direction of Louis Nagy, Central Region Sales Manager, who has been serving as Staff Assistant to Bert Cole, General Sales Manager, at American Bosch Division in Springfield, Mass.



Shown breaking ground for new American Bosch Regional Branch operation (l. to r.) John Peters, builder; F. J. Mackey, assistant vice president; Lou Nagy, central region sales manager; Bert Cole, general sales manager; Paul Gorman, industrial engineer, all of American Bosch Division, American Bosch Arma Corp.

Fairbanks-Morse Appoints Howard Diesel Division Manager



Sheldon K. Howard

Robert H. Morse, Jr., President of Fairbanks, Morse & Co., announced today the appointment of Sheldon K. Howard as Diesel Division Manager to succeed Carroll E. Dietle who has resigned. Mr. Howard comes to Chicago from Atlanta where he has been Manager of the Diesel Department of that F-M branch for the past eight years. Prior to 1952 he was a diesel sales engineer in the Boston territory. Mr. Howard is a graduate of the University of Maine where he received his B.S. degree in Mechanical Engineering in 1939.

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MANY YEARS IN THE POWERING
OF TUGS IS INCORPORATED IN THE
BRIGGS EQUIPPED . . .

NANCY MORAN and
DALZELL EAGLE

featured in this issue
of DIESEL PROGRESS . . .

AS DESIGNS ARE IMPROVED . . . as planning and operational techniques are developed, it is important to note that engineers almost always include Briggs Filters for the better and more efficient operation of craft that must earn their salt in daily commercial use.

TO HELP YOU DECIDE what type of filtration is best suited for your vessel, the Briggs manual "Water and Abrasives Removal from Fuel Oil of Sea Going Vessels" will be sent upon request. It will point out many features that will contribute to many and more profitable working hours. Write for your copy, no obligation, of course.



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FOR OVER A QUARTER OF A CENTURY
THE BRIGGS FILTRATION COMPANY, DEPT. 299 WASHINGTON 16, D. C.

**Large Midwest Distributor
To Handle Hercules**

Illinois Auto Electric Co., one of the largest independent distributor of transportation and industrial supplies in the middle west, has been appointed distributor for Hercules Motors Corp. in northern Illinois and northern Indiana. Already warehouse distributor and serv-

ice center for over 100 leading lines of transportation parts and supplies, the 43-year-old company will handle Hercules' entire line of industrial and automotive engines—ranging in capacity from 5 to 600 hp. Many of IAE's network of some 1,000 service distributors and service stations for the parts and accessories it distributes will have responsibilities for Hercules engines. According

to Henry B. Sirotek, IAE vice president and general manager, the Hercules department will be centered at the company's recently completed Forest View Division, 4750 S. Central Ave., Forest View, Ill. The new facility has 16,000 sq. ft. of column-clear shop area for servicing tractors and trailers, buses and other vehicles, in addition to five acres of parking space. It is adjacent to a major trucking terminal center.

ment and employs detailed cross sections with shading in colors to show the details of the flow of the feed, sludge, and purified streams. Various models are compared in the same way and the complete operating cycle of the automatic sludge discharge mechanism is also pictured. Featured in the bulletin is a table showing capacity of each of these five models for desludging various materials. Model SAOG-4016, for example, will purify up to 1200 gph of motor testing stand oil or up to 950 gph of drive fuel oil, among other products. Pictures and drawings illustrate the machines and their construction as well as showing typical hook ups. Copies of the bulletin (No. 2177) are available from Centrico, Inc., 75 West Forest Ave., Englewood, N.J.

ITS NEW

Metal Hose For Diesels

Helpful data on best ways to overcome flexation and vibration problems of diesel pipeline connections are contained in the new Allflex flexible metal hose data sheet #552 just issued by Allied Metal Hose Co., Long Island City, N.Y. Distilled from years of specialized experience, the charts and diagrams give clear, easy-to-read recommendations for engine exhaust, air intake and oil lines that require flexible, leakproof connections to compensate for vibration, expansion, offset, misalignment and other problems. Many typical installations are helpfully diagrammed. Some of these are 90° permanent bends (all hose or with elbows), lateral and vertical offset, expansion and contraction. A convenient check list enumerates important size and application information. Copies of the 10-X-552 diesel data sheet are available from the Allied Metal Hose Co., 3753 Ninth St., Long Island City 1, N.Y.

ITS NEW

**Interstate Orders 40
Diesel Tractors**

An \$875,000 order for 40 International model DCOF-405 extra heavy-duty truck tractors has been placed by Interstate Motor Freight System, L. D. Rahilly, president of the large common carrier, has announced. Delivery of the six-wheel units is scheduled to begin shortly. They will be fleet additions and replacements for the firm's newly acquired Prucka division which operates between Chicago and Denver. According to Rahilly, Interstate expects to increase its gross revenue by almost 50 per cent this year—from \$35 million plus in 1958 to approximately \$50 million in 1959. Factors will be a general increase in business and the addition of revenues from Connecticut Motor Lines, Inc., and the former Prucka Transportation, Inc., Rahilly said. Prucka was purchased in January. Indefinite authority to operate Connecticut Motor Lines also was recently granted Interstate by the Interstate Commerce Commission. The new 148 in. wheelbase DCOF-405 trucks are powered by 220 hp Cummins NH-220 diesel engines and have ten-speed Road-Ranger transmissions and sleeper cabs. Trucks on Interstate's Prucka division are predominantly International. Interstate now serves 8,026 communities in states as far east as Massachusetts and as far west as Wyoming. Its road fleet consists of 650 trucks and 1,500 trailers.

360 HP Tournapull Announced

A new 360 hp model B Tournapull has been announced by LeTourneau-Westinghouse Co. A new transmission is also offered for this machine. The new engine is a GM Diesel turbocharged six-cylinder two-cycle diesel. This engine, the GM 6-110T, is available in combination with either the special Allison torque-converter transmission, or the newly offered step gear transmis-

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205 Willis Street / Bedford, Ohio

sion. According to the engineers, this engine, a 360 hp unit, has a turbo-charger that was not previously available for the two-cycle engine in the "B" Tournapull. The new engine gives a greater power output because of improved compression and exhaust characteristics. Company officials point out that the other optional 335 hp engines in the model B are still available for normal, average conditions, and the new 360 hp unit is for those conditions requiring more power. The special Allison torque-converter transmission permits altering gear ratios to provide a better selection of speeds. This transmission is available for the 360 hp machine. The new heavy-duty step-gear transmission which is also available with the 360 hp machine, is a smoother and easier shifting unit. This is made possible by the elimination of the shifting lever on the auxiliary gear box. Thus, only one lever is used by the operator to shift the main transmission since the auxiliary gear box is air actuated. The B scraper remains at its struck capacity of 21 cu. yds. and 28 cu. yds. heaped. As with the other size Tournapull lines, the B scraper is readily interchangeable with other trailing units designed for use behind the prime mover. In addition to the scraper, there are currently available a 35 ton rear dump and a 30 ton crane in the B size units.

ITS NEW

Motor Company Advances Klatt

Mr. Wesley Klatt has been named Manager of Engineering Records at the Waukesha Motor Co. In his new position Klatt will direct the operations of the specification department, the preparation and release of new parts and components directives, standardization and interchangeability records, power curve data, and engineering specifications and records in general. After his graduation with a Mechanical Engineering degree from the University of Wisconsin, Klatt joined the Waukesha Motor Co. engineering department in 1929. In 1950 he was named Installation Engineer. He has a background of wide experience with internal combustion engines, having been intimately associated with their design and development in connection with his duties at the Motor Company and his activities on technical committees of the Society of Automotive Engineers. Recently, he was honored by the SAE with a Certificate of Appreciation of the Technical Board for his work in the development of standards used in the automotive industry.

Gear Bulletin Available

The Industrial Products Division of Western Gear Corporation announces the availability of Bulletin 5908 which contains complete engineering informa-

tion and specifications on the Speed-Master line of vertical-helical speed reducers. This bulletin covers both double and triple reduction SpeedMaster reducers and includes selection instructions covering many different types of installations. For your copy of this bulletin, write Western Gear Corp., Industrial Products Division, P.O. Box 126, Belmont, Calif.

ITS NEW

READY TO MAIL MAY 15!! The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, this Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

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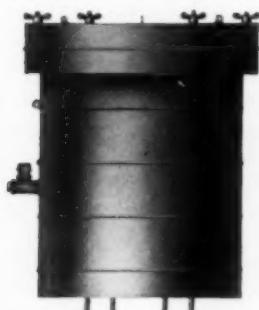
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for air intakes of engines • compressors • pressure blowers



Silencing intake noise as well as cleaning of intake air are combined into one compact, efficient unit. Keeps harmful dirt from engines, compressors and blowers. Cuts noise level in engine and compressor rooms. Available in oil-wetted, oil bath and dry types. On oil-wetted type intake dust is impinged on a series of oil-wetted wire

baffles. On oil bath type (used when dust concentrations are high), filter media is enclosed in a bowl containing oil to scrub the air before the air enters the filtering media. Dry-type for use where oil-free air and fine degree of filtration are required.

Furnished in standard sizes to 6,500 cfm. Write for Bulletin FSC-353. **The Air-Maze Corporation, Dept. DP-5, Cleveland 28, Ohio.**

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DIESEL DIVISION

National Metal & Steel Corp.
TERMINAL ISLAND (Los Angeles Harbor), CALIF.
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Air-Actuated Gear Shifting Control

Fuller Manufacturing Co. has announced production of a new, air-actuated gear shifting control unit for the 10-speed Fuller RoadRanger transmissions. Called Fullair Control, the unit consists of a small master control which replaces the conventional gear shift lever or corresponding part of a mechanically actuated remote control. Movement of the short shift lever of the master control through the normal shift pattern identified on a slotted template actuates air valves, which in turn release compressed air to a slave unit on the

transmission to activate power cylinders in such a manner as to select and engage the particular gear combination required by the driver. An electrical connection between the slave unit on the transmission and a light on the instrument panel identifies the neutral and in-gear positions of the transmission. The light will be on when the transmission is in neutral, and off in the geared positions. If the light remains on after the shift, gear engagement has not been secured and the driver is warned to de-clutch and repeat the shift. The standard range selector handle, familiar to all operators of RoadRanger transmissions, is mounted near the Fullair Control. The selector handle is used with a Fullair Control in identically the same manner as with 10-speed RoadRangers equipped with the standard gear shift lever. As a result, quick, easy engagement of all ten forward and two reverse speeds is literally at the driver's fingertips. Advantages of Fullair Control include positive, effortless gear shifting through the use of air power and employment of flexible air lines which eliminate clearance problems encountered with mechanical linkage in tilt cab and cab over engine type vehicles.

Fullair Control is presently available on RoadRanger models R-96, R-960, RA-96, RA-960, R-63, RA-63, R-630D, and RA-630D, and will soon be offered with other Fuller transmissions. Details may be obtained by writing to Fuller Manufacturing Co., Transmission Division, Kalamazoo, Mich.

ITS NEW



Sales Staff Changes at Clayton

The growing importance of the dynamometer is behind the sales staff changes at Clayton Manufacturing Co., according to J. A. Cortright, sales vice president for the El Monte, Calif. firm. Messrs. George Mackey and E. N. (Elwood) Moon have been appointed special assistants to Roy Adams, director of sales for Clayton's dynamometer division. Active in dyno sales for six years, Mackey will concentrate on the truck, tractor, bus, and industrial fields. Moon, who moves from the advertising manager post, will concentrate on the pas-



George Mackey

E. N. Moon

senger car field—car dealers, service stations, independent repair shops. Both men will carry the title of Assistant to Director of Sales. In his announcement, Cortright stressed that dynamometers are not new to the automobile industry where they are used to establish engineering standards. Clayton has produced such a unit for practical use as a service tool in establishing performance output and customer satisfaction. "Dynamometer usage is expanding rapidly in both the passenger car and heavy equipment fields", said Cortright, "and each field needs specialized planning. Our new sales staff setup is designed to help meet that need. It will enable us to offer better service to our customers."

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See Our Catalog in Sweet's Industrial
Construction and Plant Engineer's File



New, Higher Horsepower Caterpillar Tractors

Two completely new Caterpillar D8 tractors, both possessing increased weight, horsepower, and productive ability over their predecessors, are announced by Caterpillar Tractor Co. The new machines are the Caterpillar series H D8 direct drive and torque converter tractors. The introduction of these new units culminates a 3½ year development program at Caterpillar, to make available a bigger, more powerful D8 Tractor, capable of providing more profitable operation on today's increasingly demanding construction, mining, logging and similar applications. The increased size and power of the new units can best be seen by comparing their statistics with those of the D8's they replace in the Company's line. Weight of the new direct drive D8 is 47,102 lbs., an increase of 4,377 over the previous D8. In torque converter models, the 47,875 lb. weight of the new series H D8 is 4,480 lbs. greater than the old machine. Dimensionally, the newly-introduced D8's are 9 ins. longer and 5 ins. higher than their predecessors. Gauge has been increased from 78 to 84 in. Length of track ground contact has been increased from 111½ to 114½ ins. to provide adequate footing for both drawbar and front-mounted equipment applications.

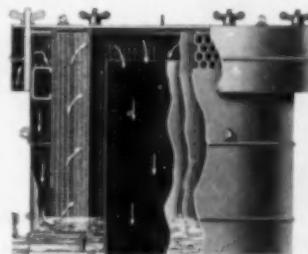
The use of double reduction final drive gearing helps provide ground clearance of nearly 20 in. on the new units. This represents an increase of more than 50 per cent over the previous D8's, giving the new machine the greatest ground clearance in its size class. Flywheel horsepower of the new units has been increased to 225 from the previous 191, an increase of 18 per cent. Drawbar horsepower on the direct drive model is 180, increased from 155. Torque rise of the new series H D8's engines has been increased to 20 per cent, which provides substantially better lugging ability in coping with tough jobs. Increased engine horsepower has come primarily from the addition of a turbocharger to the D8 engine. Specifically designed to match the new tractors' applications, the new turbocharger underwent thousands of test hours on contractors' job sites before its introduction on the new units. Its introduction makes available two turbocharged track-type tractor engines in the Caterpillar line, as the series H D8 tractor joins the turbocharged Cat D9 tractor. The new engine also has newly-designed manifolding to accommodate mounting of the turbocharger and air cleaner. To increase engine efficiency, the inlet and exhaust passages within the head have been streamlined, permitting a maximum amount of air to enter each cylinder and reducing back pressure by the fast discharge of burned gases.

Another new feature of the D8 series H Tractor is the pressure-lubrication of the entire power train with completely filtered oil. Engine-type oil (SAE 30) is used to lubricate and cool the transmission, bevel gears and steering clutches. The compartments housing these power train components are interconnected, forming a common oil sump, which is serviced by a two-section pump. Oil from the pump's front section provides boosting of the steering brakes. Oil pumped by the rear section is full-flow filtered, after which a portion of it is used to actuate the steering clutch control, and lubricate the control, bevel gear pinion and shaft bearings. The filtered oil flows through a water-cooled heat exchanger to a transmission manifold which controls pressure lubrication of transmission bearings, gears and shafts. The steering clutches and brakes are cooled and lubricated by operating in the reservoir of oil in the sump. Final drive gears and bearings are pressure lubricated with completely filtered oil by the use of a newly-incorporated final drive sump, oil pump, and filter. The use of double reduction final drive gears reduces loads on all components of the power train. A dry type air cleaner, recently made available on several other Caterpillar prime movers, is also a feature of the engine powering the D8 Series H Tractor. Prime benefits of the new air cleaner are improved filtration of engine intake air, and reduced maintenance costs due to the elimination of oil in the cleaner and a reduction in servicing time of at least 75 per cent.

The new transmission on the direct drive model is directly reversing in all six speeds. Top reverse speed is nearly double that available on the previous direct drive model. In addition, the new high forward speed has been increased to 6.3 mph from 5.2 mph. The new transmission has four shafts, rather than three as on the previous direct drive transmission, and retains the easy-shifting characteristics of constant mesh gears. Design features to facilitate operator comfort and visibility have also been included in the new D8 Tractor. Steering clutch and governor control levers are mounted on a console for better accessibility and to provide an unobstructed deck. Operator effort is reduced by hydraulically actuated steering clutches and hydraulically boosted flywheel clutch and brakes. A foot decelerator, which is standard on the torque converter model and optional on the direct drive model, provides increased and easier maneuverability. Included among the retained features of the new Cat Series H D8 Tractor are the oil-type flywheel clutch, live power to the cable control unit, and in-seat starting.

OIL BATH AIR FILTER

for engines, compressors and blowers



The Air-Maze Type F filter provides efficient removal of fine dirt from intake air to reduce wear on engine, compressor or blower parts.

High dirt removal efficiency is attained through its thorough scrubbing action. This scrubbing action

is created by directing dirt-laden air into intimate contact with an oil pool. A "manometer" action created by the air passing a continuous baffle within the pool, causes more oil to be re-cycled than on other types of filter designs. Any dirt that remains in the air is then impinged on metal baffles. The metal baffles are kept clean by constant wash of the oil bath.

Flexible in design, the Type F filter can be furnished with top or bottom outlets, with or without relief valves to handle compressor unloading or line surges. Where noise reduction is a factor, the filter can be furnished with silencing chamber.

Available in sizes from 20 to 6650 cfm. Write Air-Maze Corporation, Cleveland 28, Ohio. Dept. DP-5.

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OPERATION**

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To Any
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SPEEDS
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You turn shipping costs into profits when you switch to General Electric's new Tri-Clad® brushless AC generators for your engine-generator sets.

UP TO 50% LIGHTER AND 35% SMALLER, the compact design of these new generators cuts out useless deadweight—nearly 1000 lbs. in some sizes—greatly reducing your shipping costs, and further helping you cut expenses by lowering engine-generator base and housing requirements.

EASY TO ASSEMBLE TO YOUR ENGINE. New G-E brushless AC generators can be furnished with 10 different adapters—SAE No. 10 to 00—and 12 different couplings—SAE No. 10 to 24—for each frame size.

BRUSHLESS FOR LESS MAINTENANCE. Hermetically-sealed

silicon rectifiers greatly simplify power conversion, eliminating exciter and slip ring brushes, commutators, slip rings and brush holders . . . slashing maintenance costs and increasing reliability.

STATIC MAGNETIC AMPLIFIER VOLTAGE REGULATOR mounted on generator. Each control is completely tested with its generator—at the factory. Includes combination volt-ammeter.

GENERAL ELECTRIC'S COMPLETE LINE of new brushless AC generators is specifically designed for your diesel and gasoline engine applications. Ratings: 10 to 150 kw at 1800 rpm; 40 to 125 kw at 1200 rpm; suitable for 50 or 60 cycle output.

FOR MORE INFORMATION contact your nearby G.E. Apparatus Sales Office, or write for bulletin GEA-6844, Section 898-1, General Electric Company, Schenectady, N. Y.

GENERAL  ELECTRIC



Designed specifically
to be driven by diesel or gasoline engines

- **50% lighter**
- **35% smaller**

No brushes to wear out



Richard L. Spetka, Manager Power Engine Sales,
The Cooper-Bessemer Corporation, explains...

How river shipping now gets its biggest push

In the background, you see a tow of 40 barges, typical of cargo-moving records now being made on the lower Mississippi by the mighty towboat *United States*. And, the picture in my hand shows two of the four Cooper-Bessemer turbo-charged diesels that give this towboat an 8500 horsepower push.

This world's record towboat can trim 30% off running time on normal tows, and compared to towboats of 20 years ago, can push three times the tonnage. Further economy is provided by the design of the engines to burn low-cost bunker C fuel oil, saving an estimated \$250 per day.

The M/V *United States* is owned and operated by Federal Barge Lines and was built by St. Louis Shipbuilding and Steel Company.

Transportation is another field in which Cooper-Bessemer applies its engineering know-how and manufacturing skills to save you money. Call on us for assistance in your planning of power or compression facilities.

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